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# Pennsylvania Agricultural Literature on Microfilm

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# CONTENTS OF REEL 57

1) Pennsylvania Live Stock Breeders' Association
   Proceedings and papers of... annual meeting, 1901
   MNS# PSt SNPaAg057.1

2) Pennsylvania Live Stock Breeders' Association
   Proceedings and papers of... annual meeting, 1902
   MNS# PSt SNPaAg057.2

3) Pennsylvania Live Stock Breeders' Association
   Proceedings and papers of... annual meeting, 1904
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7) Pennsylvania Live Stock Breeders' Association
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# CONTENTS OF REEL 57 (CONTINUED)

10) Pennsylvania Live Stock Breeders' Association
Proceedings and papers of... annual meeting, 1911
MNS# PSt SNPaAg057.10

Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1901

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1901

Master Negative Storage Number: MNS# PSt SNPaAg057.1

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260    Pittsburgh, Pa. [etc.] $bAxtell-Rush Publishing Co.
300    v. $bill. $c24 cm.
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       Union; meetings for 1911-<1915?> are joint meetings with the
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500    Description based on: 3rd (1901)
500    Imprint varies
500    No meeting held in 1903
500    Proceedings for <1901>- called Bulletin no. 7-
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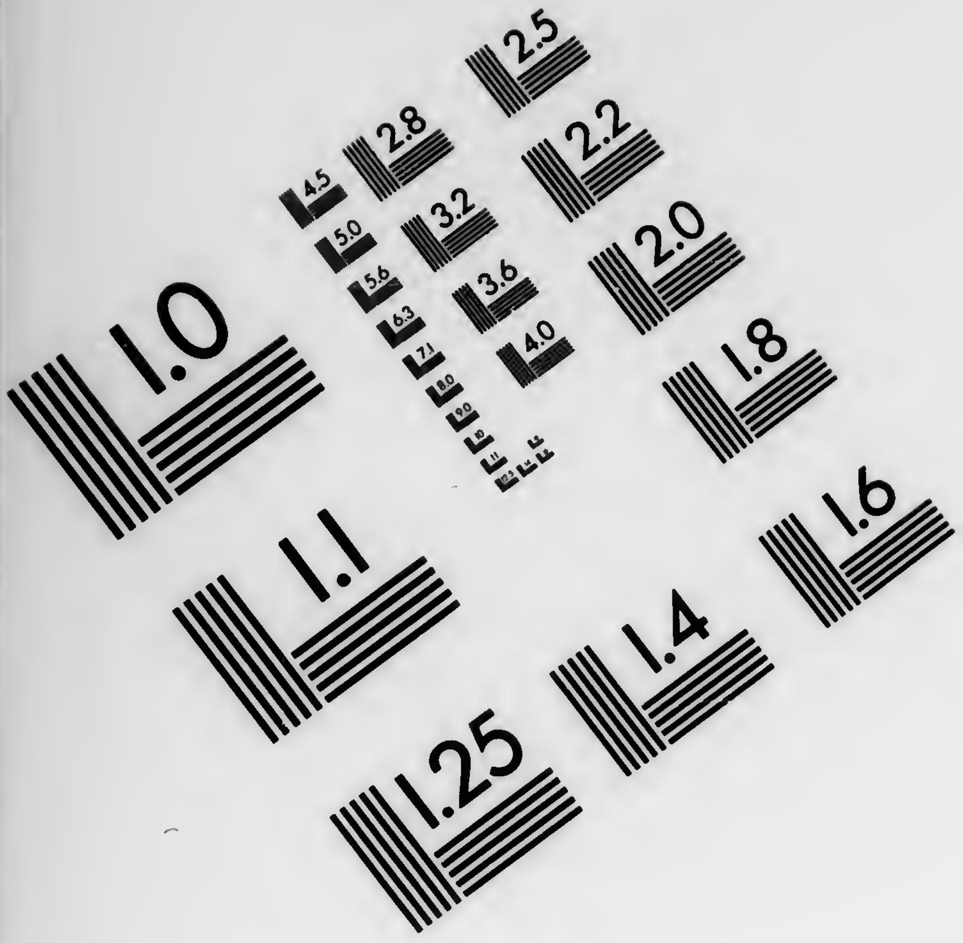

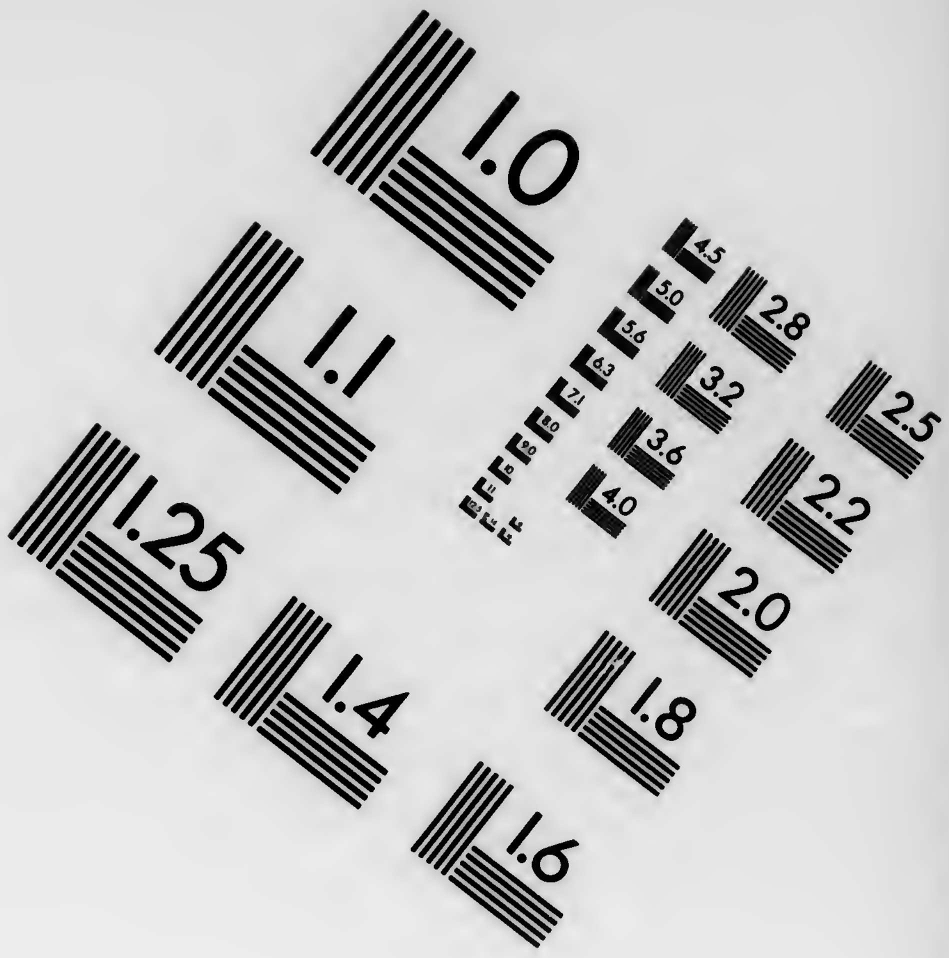

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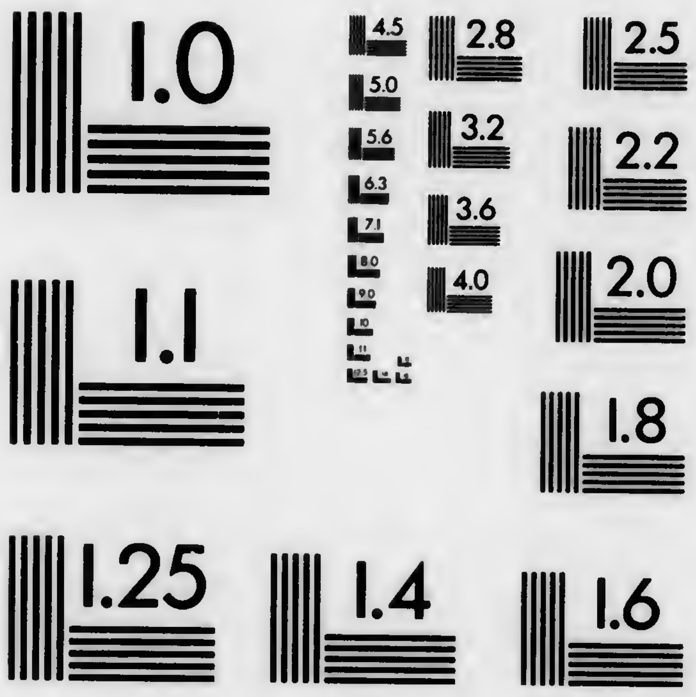

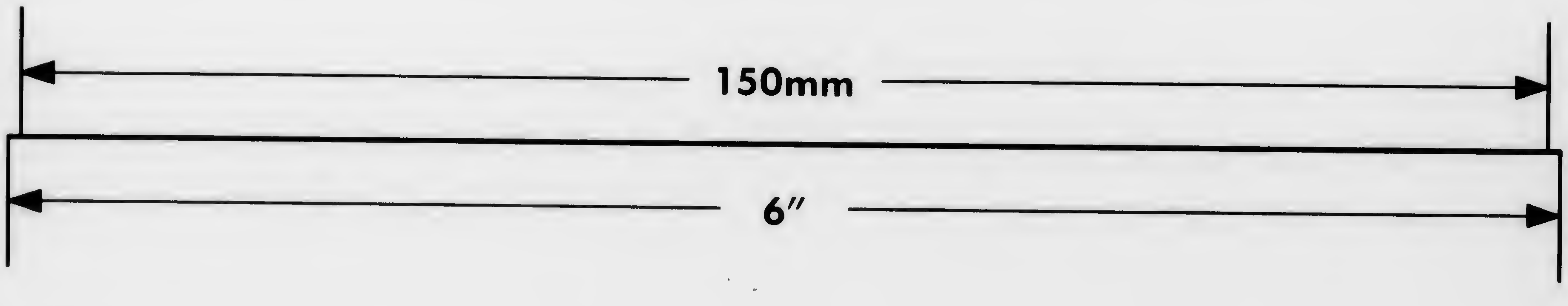

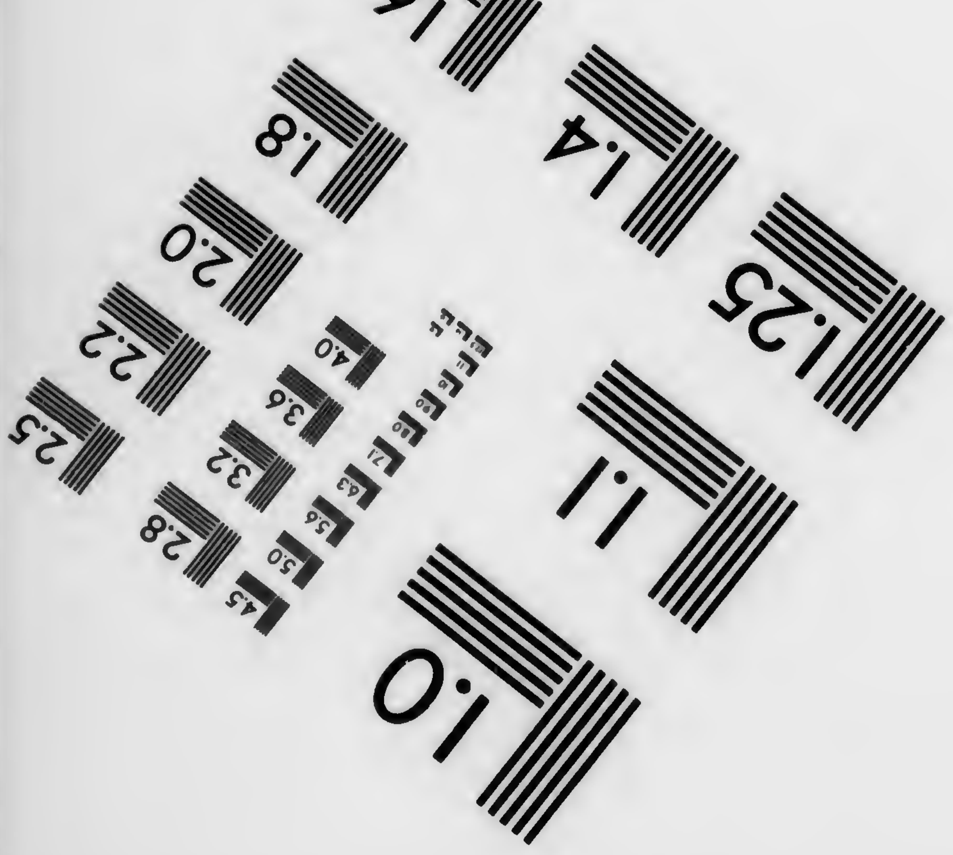

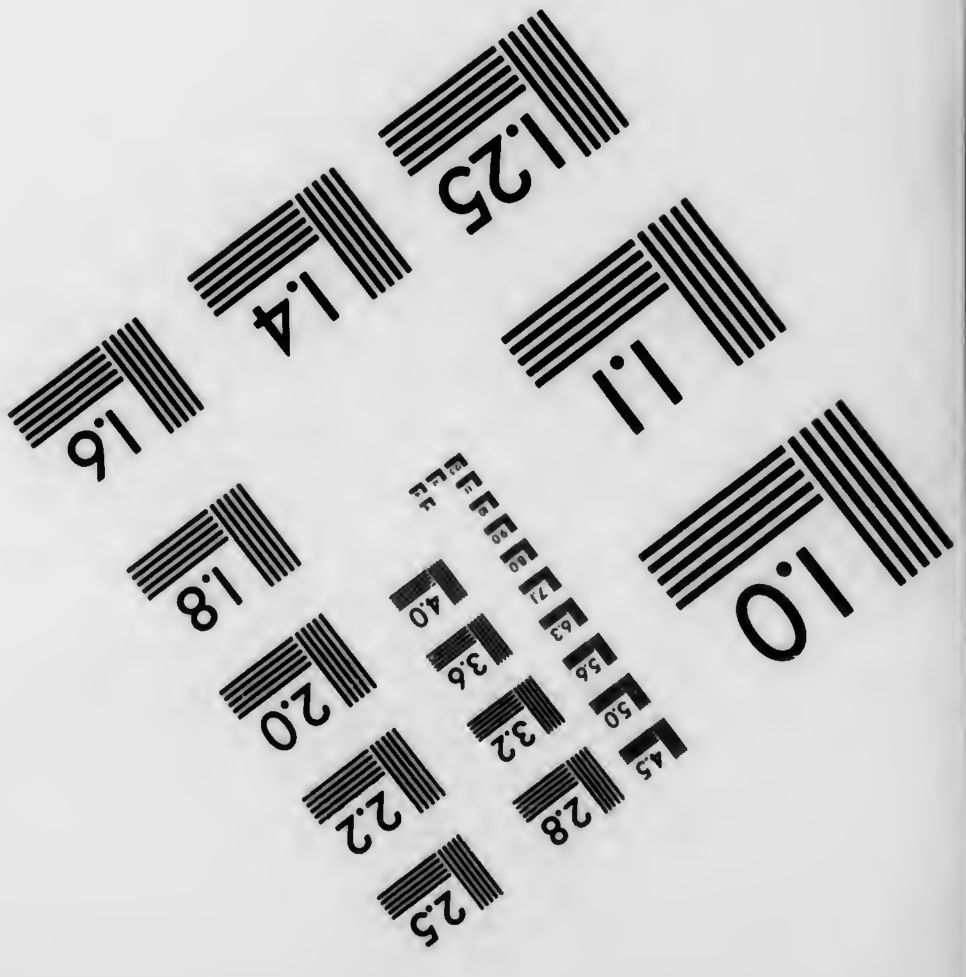

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# 1901

Bulletin No. 7 of

# THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION.

## PROCEEDINGS and PAPERS of THIRD ANNUAL MEETING HELD AT PITTSBURG,

December 18 and 19, 1901.

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# PROCEEDINGS AND PAPERS

OF

# THIRD ANNUAL MEETING

OF

# THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

Held at Pittsburg, Dec. 18 *and* 19, 1901.

1902.
THE AXTELL-RUSH PUBLISHING CO.
Pittsburg, Pa.

# EXPLANATORY.

*At the opening of our annual meeting last year the Secretary employed John J. Burke, of Pittsburg, to make a stenographic report of the proceedings. Mr. Burke was paid a per diem fee in advance and was present during the meeting taking stenographic notes. Owing to his presence, the Secretary made no notes of the business transacted, or of the discussions, other than to outline the most important points. Mr. Burke agreed to deliver his notes type-written and in form for publication for a stipulated sum per page. This he has failed to do, in spite of repeated urgent requests. Owing to his failure to carry out his contract it has been impossible for the Secretary to publish this report promptly or to give a complete record of the Association's transactions. Our inability to publish a complete report is a great disappointment to our members and a great loss to the live stock literature of Pennsylvania; but, after considerable trouble and delay, the following has been secured. It is presented with regret for the absence of several notable addresses and the total absence of discussions. Another year it is hoped that a complete report may be made.*

# PROCEEDINGS.

## Synopsis of Annual Meeting.

The Pennsylvania Live Stock Breeders' Association held its third annual meeting at Pittsburg, Wednesday and Thursday, December 18 and 19. The flood and following blizzard which swept over the state a few days previous deterred many from coming, still there was a fair attendance. about 100 being present on the second day. At the first session, on Wednesday morning, the convention proceeded to business. The Secretary reported that about 150 had paid their membership fees for 1901; the Association had almost doubled its number of members. Since the last meeting he had dsent out five bulletins, also furnished the classification and list of judges adopted by the Fair Committee, to all county fairs. The Treasurer reported a small balance on hand after paying the expenses of preparation for the current meeting. Hon. W. H. H. Riddle, reporting for the Legislative Committee, stated that nothing had been done in regard to a state fair, owing to a provision of the state constitution which seems to forbid a new corporation. Mr. W. C. Black, for the committee on fairs, reported that the committee had met in Pittsburg and had adopted a classification of live stock which had been recommended to all fair associations of the state. and had also recommended a number of expert judges. He urged that the committee on fairs be reduced on three members, which was later done. At the afternoon session "Bob" Seeds opened the hall with his talk on "Forage Crops and Fertility." He told how he had taken an abandoned farm and in eight years, by making a fertilizer factory of it, brought it to a high state of fertility; had clover 27 inches high on the 14th of last Jun. His land is now filled with vegetable matter, and will hold much more water than clammy land. Mr. Seeds ensiloes clover successfully. Hauls in corn fodder and cuts it. Feeds everything in the barn. Uses bull to run tread power. Cuts fodder three-fourths of an inch long, and has no trouble with sore mouths.

### The Mutton Sheep.

Mr. S. H. Todd, Wakeman, O., followed with an address on "The Mutton Sheep." He made an eloquent plea for the sheep, and stated that the dollars and cents which the sheep bring in when they go to market is not the whole thing. They keep down weeds, drive away or destroy parasites and destructive insects in the pasture. He claims that hog cholera is not so apt to occur where sheep are kept. The great trouble with the American people is that they have been taught to keep sheep for wool only. Wool is a protein product and must come from a protein body. In breeding mutton sheep pay little attention to the wool and special attention to the conformation. The head of the breeding animal is important; a good brained animal is just as important as a good-brained man. The nervous energy of a sheep is indicated by the use of the eyelids and the working of the jaw. In regard to stomach worms, he believes in doctoring the old sheep before they are turned to pasture, thus avoiding the deposit of stomach worms on the pasture by the sheep. Turpentine will not hurt a pregnant ewe. Mr. Powell stated that corn fodder could be cut and stored quite green if stood on end, but would spoil if laid down.

### Cattle Feeding.

Mr. O. E. Bradfute followed with an address on "Growing the Modern Beef Animal for Market." He described the most profitable market bullock of today as a well formed animal of medium weight. Feeders cannot afford to put high-priced grain into animals which will not make the best possible return for it. He would pay special attention to the head of a feeder. Likes a good broad head of medium size, a mild but bright eye. The feeding steer should be as near as possible the same width all the way through, its ribs well back, well ribbed fore and aft; the shorter the neck the better; not too much bone, and not too prominent on the hips. The speaker showed illustrations of a beef animal cut up for market, from which it appears that 64 per cent of the value of the carcass is along the back. Advocates feeding shock corn out of doors. The ordinary feeder cannot afford to build a barn, grind feed and cut fodder for his animals. Some kind of shelter that will keep them dry and out of the wind is all that is necessary. He plants corn rather thick, thus getting more fodder and smaller ears, which are easier for the cattle to eat. Husked corn soon becomes too hard for the best results with cattle. Feeds on bunk 16 feet long, with hogs following cattle. Mr. Bradfute showed illustrations of profitable beef types as contrasted with dairy types, and later on commented on photographs of prize winners at the Chicago Fat Stock Show, naming their good points.

### The Dairy Calf.

Thursday morning Mr. W. F. McSparran was the first speaker, his subject being "Breeding and Feeding the Dairy Calf." He began with the treatment of the cow. Before calving he gives a dose of salts (1 to 1¼ pounds) once a week for six weeks. In winter feeds silage and bran, withholding cottonseed meal. If the cow is a rich milker she ought to be stripped out before calving. The Jersey calf is difficult to raise. The speaker allows the calf to drink the dam's milk at once, but diluted with half as much water. Keeps the calves hungry, thinks they are better hungry than dead. Mr. Shannon believes in the treatment advocated by Dr. Smead, and since following that has not lost any calves; lost thousands of dollars' worth before that. Mr. Norton did not agree with Dr. Smead, thought that the mother's milk had nothing to do with the loss of calves. Mr. Shannon stated that it is not the fat in Jersey milk, but the solids, which causes trouble with calves. Gave illustrations from the feeding of calves and babies, in which the fat had been increased and the solids reduced with beneficial results. In case of scours Mr. McSparran gives milk diluted with water, fed at blood heat, a dose of castor oil and a small dose of laudanum. The Jersey breeders present emphasized the fact that contagious calf scours is not peculiar to the Jersey breed: in fact it originated in a herd of common cows.

### Swine Management.

Mr. S. H. Todd spoke on the "Management of a Herd of Pure-Bred Swine." The first essential is health and a good constitution. When perfection is reached swine will be able to withstand even hog cholera. Mate similar types. First cross of roomy, loose-built sow and tidy, close-built boar is good, after that uncertain. Breed for prolific animals; no matter how good they are if there are not enough of them. Watch the sow at farrowing time, and if two pigs want the same teat separate them. Take the pig by the tail when necessary to lift it—this is the handle which Nature has provided. For scours in pigs put two-thirds of a teaspoonful of copperas in the slop of the sow. Don't feed a pig bran or corn-cob meal. Mr. Todd believes in using plenty of corn. He thinks it is greatest feed for making good pigs, but does not believe in feeding corn exclusively. Sows are bred twice a year. For kidney weakness uses turpentine. Apples in any quantity should not be fed to a brood sow. Frozen potatoes will almost invariably cause abortion.

### The Value of Silage.

Mr. L. P. Bailey read an address on "The Future of Dairy Production." Mr. Bailey has confidence in the future for the right kind of dairying. He believes in improved breeding as one of the means of economical production, and he thinks that the up-to-date dairyman can produce butter at a price that will drive oleomargarine out of the market.

Prof. J. Fremont Hickman discussed "The Silo and the Breeder." Prof. Hickman's common-sense ideas in regard to silage were endorsed by every one who heard him. He does not claim everything for silage, but believes it is good for most farm stock if fed judiciously. It is not the best feed for fattening cattle, nor for horses at hard work. It is not a complete feed for anything, and should not be fed in excess of thirty pounds per day to cattle and three or four pounds to sheep; horses may safely have one-half bushel per day. In discussion the fact was brought out that sugar beet pulp is worth about half as much as silage. Gluten feed is much inferior to gluten meal. Mr. McSparran believe that fat stored on the animal in the winter is returned to him in

the form of butter fat when the animal is on pasture in the summer.

Dr. Leonard Pearson was unable to be present.

### Cattle Management.

Mr. O. E. Bradfute discussed the "Management of a Herd of Beef Cattle." The first essential is a good herd. To get the right kind study the proper type, have a clear idea of what you want. Believes the cheapest plan for a beginner is to buy a cow with calf at side and breed again. He wants a good development of the animal the first twelve months of its life. If it is never allowed to run down during this period it will retain its flesh throughout its life, even if fed only an ordinary ration. The best feed is milk, but not Jersey milk. An abundance of milk is better than a small quantity of rich milk. Feeds in connection with it a little shelled corn. If scours appears shut off the corn and milk both for a while. Be sure to see if the calf takes all the milk of its dam; if not milk her clean. Milk left in the udder will make a sick calf. Takes the calves from the cows, turning them in night and morning. Give the calves plenty of water. Every breeding animal should have abundant exercise in the open air every day, regardless of the weather. It pays the breeder to advertise judiciously.

Dr. H. P. Armsby, discussed "The Respiration-Calorimeter." His remarks were necessarily limited, as the time for closing was approaching. Hon. John Hamilton briefly addressed the meeting, showing what work had been done in the Agricultural Department in the interest of live stock breeders, especially in regard to the adulteration of commercial feeding stuffs.

A committee was appointed with instructions to meet the representatives of the State Dairy Union to arrange time and place for the next annual meeting, which is to be held jointly with that of the Dairy Union. The committee was also instructed to invite all other live stock associations or kindred organizations in the state to meet at the same time and place. A committee to meet those of other agricultural associations for the purpose of furthering agricultural education was also appointed. The constitution was amended so as to elect all committees annually, and the fair committee was reduced to three. A vote of appreciation of the services of Hon. John Hamilton, Secretary of Agriculture, and of his Department in the interest of live stock breeders was unanimously given.

Officers were elected as follows:

President—W. C. Norton, Aldenville.

1st Vice-President — Henry Palmer, Avondale.

2d Vice-President—M. P. Shoemaker, Greensburg.

Secretary—E. S. Bayard, East End, Pittsburg.

Treasurer—J. F. Lantz, Isabella.

Executive Committee—W. G. Powell, Shadeland; Edward Walter, West Chester; Geo. W. Church, Waynesburg; Wm. Berry, Washington; George C. Watson, State College; H. A. Field, Wellsboro; the officers of the Association, ex-officio.

Legislative Committee—Dr. Thos. Turnbull, Allegheny; R. L. Munce, Canonsburg; W. F. Gable, Altoona; Wm. R. Williams, Philadelphia; H. W. Comfort, Fallsington; the President and Secretary, ex-officio.

Committee on Transportation—Julius LeMoyne, Washington; Dr. Leonard Pearson, Philadelphia; Prof. Harry Hayward, State College; T. E. Orr, Pittsburg; D. L. Stevens, Elkdale.

Committtee on Fairs—W. C. Black, Mercer; J. L. Henderson, Washington; W. F. Holtzer, Greensburg.

# The Mutton Sheep.

## S. H. TODD, Wakeman, Ohio.

Mr. President and Gentlemen, it gives me great pleasure to meet the members of the Live Stock Breeders' Association and talk to you on that, the most interesting of all farm topics, "The Sheep." For I love the sheep. I love them because of the money they bring, in return for the food they consume. I love them because of the interest they take in the farm, keeping down the brush and obnoxious weeds, making even the lazy man's farm fairly presentable to the passer-by. I love them because of their destruction to insect life. I remember a few years ago of having a clover field infested with the little round clover worm, to such an extent that every leaf had been riddled by their work, and it looked as if I might say "goodbye" to clover. I turned on to the same field my 200 head of sheep, to destroy the worms. Every worm that the golden foot stepped upon it crushed, and in taking the remains of the leaves into their stomachs, they took thousands and tens of thousands of these little worms; digested and assimilated them into mutton. And the mutton was just as wholesome and palatable as if made from the best clover. I killed one of the sheep that had been grazing on this clover, and carried a piece of the mutton to our minister. I think I never heard him preach a better sermon than he did the following Sunday.

My subject would indicate that there are at least two kinds of sheep. One for mutton and one for wool. Which is true to a letter; and must be carefully observed if one would have success. The confusion and dissatisfaction that have shrouded the sheep industry come largely from the determination to have a dual purpose sheep. My experience has shown me that whenever I have increased the wool on my mutton sheep, I have lost proportionately on them as mutton producers. And on fine wool sheep, whenever I have undertaken to get a formation for mutton carcass, and thus increase their mutton quality, I have lost proportionately in wool. And this has been the experience of expert breeders in handling not only sheep but other stock as well. A sheep to bear wool is constructed in an entirely different manner from a sheep to product mutton. And as formation plays such a part in the profitableness of mutton sheep, I will sketch to you my ideal form. Sheep should be long in body, broad in back and back well covered with meat, ribs well arched, so even in width of body, that lines running from end to end midway of the sides of the sheep will be parallel. Loin should be broad and thick; ham full on top, and well let down to gambrel joint. Breech should be full and firm, insuring a good leg o' mutton. Flank should be short, thick and let down to under line of sheep; so that when the sheep is slaughtered and hung on the pegs the hind quarters won't pull away from the carcass and present the appearance of a jackrabbit. Legs should be short, firm and well apart. Well up on feet. Neck short, arched and so attached to the body as to have a pleasing effect upon the eye. Head short, nostril large, face wide, a good distance between the eyes and the top of the poll, broad on top of the poll. Eye sparkling and determined; jaws large and firm, these are the millstones of the sheep. We can't overestimate the importance of the jaws in the practical work that is going on. Sheep must have a large, active brain. The formation of the head will determine the size, the letting down of the eyelids, the snap of the eye and the revolution of the jaw when eating or chewing the cud will in indicate the activity of the brain. As prepotency is a nerve element, a sheep constructed in this way will be very prepotent, which is all important in the mutton sire, so that when crossed on the fine wool sheep, or the mountain sheep of the Southern states, he will stamp his progeny so that they can be handled satisfactorily for the mutton market. And with this cross is the way and the only way in which we can approach a dual purpose sheep.

We breed our sheep so that our lambs, which we feed the coming winter, may be dropped in March and April. We would have them dropped earlier if it were not that they get too large. The large lamb sells at a discount. The lamb which weighs from 80 to 100 pounds sells at a premium. Some object to this season on account of ugly weather, but farmers usually have more spare time, and can give their sheep better attention, which outweighs the advantages of having them lamb in warm weather. Besides a lamb which gets a start before the hot sultry weather sets in, as a rule, will do much better.

As proper food is essential to life and development, I will offer a word on that line. We keep our sire housed, feeding him a grain ration of two-thirds oats and one-third corn three or four weeks before we use him. We give our ewes good, fresh pasture if we can get it; together with rape, and for a ewe that will weigh a hundred pounds or over we give half a pint of grain a day, for three or four weeks before breeding. Grain to consist of half oats and half corn in bulk. We turn our sire out with ewes at night and keep him housed through the day. An over-worked sire will give very unsatisfactory progeny. You will notice this in the last lambs of the flock. They are nearly always inferior to the first.

For our winter's ration for breeding sheep we give oats and corn, half and half, with clover hay for roughage. If we feed corn fodder we make the grain ration stronger with oats, and as the lambing season approaches we make the grain ration about one-third bran. We don't feed our sheep any roots winters, simply because with our experience we have come to the conclusion it doesn't pay. If we have clover hay we feed our mutton lambs a grain ration exclusively of corn. If we feed corn fodder, we put in some oats and a little bran. We may use self feeders or may not. I prefer to feed lambs without the self feeder, providing they are handy to the house. If fed on self feeders they mustn't be fed more than two months or two months and a half before put on the market if you would get the best results.

A lamb must be fed so as to grow from start to finish if the balance sheet is to show in our favor.

While the mutton sheep would seem to have a constitution as good or better than the Merino sheep, judging from the way the lambs stand up against winter blasts and adverse circumstances, still in our climate they seem to be more susceptible to the parasitical diseases. We can only account for this on the ground that whatever is agreeable to the taste of man is also proportionately agreeable to the lower insect life. In other words the insects like what is good, and thrive better and multiply faster under good care and feed. Just a word here about the stomach worm which has proven so detrimental to mutton sheep in this country.

We have come to the conclusion that the worn is not carried over through the winter, as was generally conceded, in old pastures; but is carried through the winter with the old sheep. Winter's housing, winter's yarding and winter's feeding make it very favorable for the worms to multiply through the winter. And when the sheep are turned on to fresh grass in the spring they physic, and these worms are carried off, and deposited on the grass without number, and are taken up by the young lambs as soon as they commence to feed on the grass. The conditions being favorable they multiply rapidly, and this drain on the animal, with the unfavorable climate, together with our neglect, enables the parasite to get the better of the lamb, and he succumbs.

We give the worm medicines to our old sheep through the winter, giving occasionally a dose of gasoline, and thus eradicate largely the parasites before the sheep are turned out and so obviate in a great measure, the trouble with our lambs. It must be remembered that mutton sheep cannot give satisfactory results when covered on the outside with ticks, red headed lice, or scab parasites. And the man who keeps a flock of sheep, thus infected, is entirely to blame. External parasites can be so easily destroyed by dipping the sheep in any of the first class dips advertised on the market. Thousands of dollars are spent every year by the sheep raisers of the country in feeding these destructive parasites. When kept at all, they must be kept as a luxury, as there is no market in the world where they will bring a cent.

The trying season of the year for the mutton sheep is June, July, August and to the twentieth of September. It is the time of year when sheep are most neglected and when they require the most care. The busy season of the year takes our time, the pasture fields are dried up, water supply neglected, often no dews, and thus the sheep run down in condition, until they become an open gateway for the parasite world to come in and take possession. We should be very careful to have some growing crop, such as corn, rape, oats to turn our sheep or at this season, and thus bridge over the danger that otherwise would come.

The Northern states where the climate

is cool, and where small flocks are kept, are much more favorable for the keeping of mutton sheep, than the more southern portion of the states, where large flocks are kept, and the weather more changeable, and the heat more excessive.

Let me urge the importance of our doctoring the old sheep in the winter season, to get rid of the nodules and all internal parasites. And then we may look for strong, healthy, money-making lambs. In conclusion let me say, choose the kind of sheep that we like best, then see to it that we breed right, feed right, and remembering that whatever is worth doing at all is worth doing right. Thanking you for your kind attention I leave the subject with you for your discussion.

## The Up-to-Date Stock Farm.

**O. E. BRADFUTE, Cedarville, Ohio.**

Mr. President and Gentlemen of the Pennsylvania Live Stock Breeders' Association:

In order to make you feel a little more friendly, I want to give you a free excursion over a portion of the country this morning if you will all go with me in your minds; you may all remain seated however. I want to start out across Ohio, run up through the eastern portion of the state into Pennsylvania, go through the dairy sections of the western parts of that state and on into the great dairy sections of the eastern part, the great feeding grounds, Lancaster and other counties, and around through the dairy sections of New York, across the Western Reserve of Ohio, on through Wisconsin and Minnesota, Iowa and Nebraska, into Missouri and back through the great cornfields of that country, through Illinois and Iowa, across Indiana and back, not omitting, however, the beautiful bluegrass regions of Kentucky. Now, in taking this little trip, if you have kept your eyes open, looking out of the windows, you can but have observed that the places where there were beautiful homes, pleasant surroundings and prosperous, intelligent men, were the places where were being conducted the up-to-date live stock operations of today. On the other hand, if you saw farms that were seemingly going to decay, small homes, unsatisfactory places to live, small barns and everything out of repair, you found those to be in a large measure the farms that were continuously growing crops of one kind and sending them to market.

I want to talk for a little while this morning on what I would consider an up-to-date live stock farm. And lest I be misunderstood and lay myself open to criticism, I want to say plainly in the outset of the talk—because a number of gentlemen present have been at our place—that I am not going to undertake to describe our own place, only in part, the other part being what we would like it to be and what we believe an up-to-date stock farm. It is true, most of us have our farms already located, and we could not change them if we wished to do so, but there may be men in this audience who are contemplating the purchase of a live stock farm, and if so I want to make a few suggestions as to what would be a desirable location for such a farm. First of all I should consider the position. I should like it to be reasonably near a railroad station; I should like the postal facilities to be good—that, however, has been largely overcome at present by the rural route systems; I should like to be not far from telephone arrangements and a telegraph station. All of these things you will find of great convenience if you are in the live stock business. Then I should observe the climate. I believe that there are sections in the same county where the climate, in one sense at least, is materially different. I refer to those beautiful southward sloping farms. The people on those farms are getting their grass a week or ten days earlier than the men on the northern slope farms. Perhaps in summer they become a little warmer, but in winter the advantages are greater, because if you have noticed your stock as they go out on the south slopes into the sunshine with evident satisfaction. So I believe a southern slope farm is a great advantage to the stock grower.

Then I should want to be in a good neighborhood. By that I mean a neighborhood that it not full of petty jealousies, where one man is not afraid that his neighbor may succeed, where the inhabitants can all work together with a common interest, where every man means to do his best and every other man is willing that he should and will aid him all he can. Pardon me if I name one location where I believe just such advantages exist, the county from which I came, Greene county, O. I am glad to say that the stockmen of that county are in the utmost harmony. The man who comes to that county, no matter what he wants, can be supplied, and they do not hesitate to tell a man if they have not what he wants that perhaps their neighbor has. Go, if you please, to Kentucky, and if you want a horse you will not get away from Kentucky without one, because the Kentuckian will say, "If I cannot supply you, perhaps my neighbor can." And that is the condition that should exist among all live-stock men. More than that, I should like to be in a neighborhood that is full of live-stock men, simply because it would become attractive to live-stock men in other sections, for if they cannot find what they want on one man's farm perhaps they can on another. Now, suppose that we are going to raise hogs. Here is a hog buyer, the market is good and everything flourishes. And he says, "Where will I go to get hogs? I will go out to this township or that township and see Smith and Jones and his neighbors; they always have them." He can afford to pay a little better price, because he can look them up quickly, and those men have an advantage in their prices. But all of us cannot change our locations, and we have to accept them as they are.

Now, just a word as to the size of the farm. It is not important that the up-to-date stock farm be a large one. We sometime get the idea that a man cannot engage in raising live stock successfully unless he has thousands of acres. I want to say that I do not believe that to be so. I know of one man—if I should mention his name many of you would know him—who is one of the most successful cattle breeders of the United States, a Hereford breeder of Illinois. He has been in the business for about thirty years, and recently disposed of his herd. His farm never ran to exceed one hundred and fifty acres, and yet he has made an enviable reputation, that any man might want to equal. His herd never exceeded fifty head of cattle, and yet his name is a household word among cattle men of two continents. It is not necessary to have great numbers of stock nor to have large farms. I might name a number of such men engaged in live stock operations with different kinds of live stock.

Now, if you please, something as to the arrangement of the farm. We cannot all arrange our farms alike. We can lay down no fixed rules for their arrangement. But I would say, primarily, your farm must be arranged with reference to its buildings and with reference to the water. Good water is the foundation of success in live-stock farming; you must have it in the greatest of abundance. In these days when we have various kinds of pumping machinery it is not necessary that we be located on streams as once it was, because we can bring the water to us instead of going to it if we have it where it is accessible. But if you have a stream running through your farm—and I have always thought that is a desirable thing on a stock farm—especially if you have a stream with a limestone bottom that will not get too muddy, it is highly desirable. Pardon me if I explain just for a moment the arrangement that we have at Meadowbrook. We have a stream running the entire length of the farm, a never-failing stream of medium size, on gravel and limestone. I might add that the farm is of such character that the lower parts of it toward the stream are the rougher portions, and the better parts for tillage lie back from the stream. We have a series of bluegrass pastures arranged along this stream, that are permanent, never broken, and back from this we have the larger fields that are farmed in regular rotation. These bluegrass pastures are rather small—ten to thirty acres. Each of them opens into some other, and if possible into two of the uplying fields. Our object in this is to afford a variety of pasturage, and at the same time convenient access to water. Our stock has access to a small bluegrass pasture upon which they spend the earlier part of the morning, perhaps, when they need to be out of the clover, and then during the day they range back to the larger pastures of mixed grasses; there is an excellent arrangement for mixed pasturage. But one cannot always arrange exactly just to suit, as it must be arranged with reference to the buildings and water.

Now, just a word with reference to the buildings upon a live-stock farm. It is not necessary to have fine palatial buildings; plain, substantial buildings are just as good for the purpose as those that are expensive. True, the others are beautiful, and if one can afford them, very desirable. but they are not necessary; what we want is convenience rather than cost. How few of the barns in Ohio are convenient for the purpose for which they are used! You can almost knock your head off in any of them getting up the stairway, if you can find a stairway; perhaps you must track clear around the barn to get into the back side. Why, a man might lose enough steps about such a barn in the course of a year to have almost gone to Jerusalem and back, whereas, if he had simply taken some time and a good hammer, some nails and a saw he could have arranged that barn and made it practical for his purpose. He is simply using the barn that his grandfather used. His grandfather used it for one purpose and he is using it for another and he has never had it changed. Let the buildings be substantial and well ventilated. Now do not misunderstand this word ventilation; there is a great deal said in the papers of these times about ventilating our barns, but as we ride along in the cars and look at the barns from the car windows, the average barn does not seem to be crying out for ventilation at this season of the year. I want ventilation, but not the kind that the average farmer is affording to his live stock. If you want to ventilate, ventilate so the wind cannot strike your animals; ventilate with trap doors in the floor and with sliding windows in the upper part of your barn. Be careful to open them upon the side from which the wind is not coming at the time, and have it so that the air will pass above the aimals.

Around these barns I would have an abundance of lots. I have never seen a barn that had enough lots where you could put different kinds of stock and different ages of stock. You will find in the average barnyard lot, sheep, cattle and horses all running together. It is perhaps desirable for the horses, but the cattle and sheep get entirely too much exercise for their good. Yes, I would separate them in accordance with the different kinds of stock, and in accordance with the ages, into different lots. Have plenty of small lots, especially for winter use.

The up-to-date stock farm has good fences. Your neighbor's stock has no right to trouble you, and neither has your stock any right to trouble your neighbor. If a man tells me he has an animal that jumps, if he has grown that animal from birth, I have a lack of confidence in him almost at once. I am pretty sure to believe that he has poor fences and has trained the animal to jump. There are exceptions, but that is a pretty good rule to go by.

We have an abundance of gates. Often we want to go from one field to another with stock, and we do not want to go away around to get there. I like a gate between each two adjoining fields on the farm; how convenient it is in getting from one field to another. These need not be too expensive. I prefer the simple Western sliding gate upon two posts, that can be slid back and opened in that way; in my judgment they are more satisfactory, where they are not used very frequently. The other gates around the barn I should have on good heavy hinges and not dragging on the ground.

Now, about the water arrangements upon this up-to-date stock farm. How many of us, if we would stop to think, could have water in the greatest abundance upon our farms where we have not now. We are not careful about this mater. I have not time to go into this in detail, but many farmers have springs upon their lands, the water from which could be conveyed through pipes to their buildings. Many have streams upon which they could locate a ram. We have tried both. With plenty of good wind mills you can always have plenty of water that is always accessible in all your fields for your stock. We like to have an abundance of good shade. We do think that a few good shade trees out in the middle of each field are not objectionable. Many want the trees right along the fences. I do not like this, because the stock is constantly tearing down your fences, and if I had a poor place in a field I should try to plant a few trees there, because the stock would stay there during the day time in the summer and would be constantly dropping manure on that poor part of the field, making it their headquarters, going out over the field to forage. Of course it is seriously tramped around these trees, but they must have some place to make headquarters.

Upon this farm we should grow a variety of food stuffs. Variety of foods is one of the great secrets in growing any kind of stock. Then feed upon the farm all that we grow. Never sell any. If we must do anything we should buy. We should save all the manure upon the farm and put it back where it is most needed.

Now, if we have this kind of a farm we certainly have to have something on it. We must stock it with up-to-date stock if we have an up-to-date farm. I am not here to say what kind of stock one should have—what breed of any kind of stock. Study your market and study yourself, and then select the kind that best suits that market and your own taste, and I venture to say that you will succeed with the stock. Do not overstock your farm. Many farmers overstock their farms and their stock loses all that it gains in the early part of the season before it gets through a dry fall. I should advise every man to take up some one specialty. I do not mean that he should put all his eggs in one basket, because on a stock farm I believe we should have a variety of stock, and therefore I would not advise his confining himself to one kind, but have one specialty upon which he has determined to make himself known; select one kind of stock and let it be known far and wide that he is breeding that particular kind, and endeavor to achieve something in the world, and that he can do better than any other man can do in that line. Therefore, I would advise a young man to take up one specialty and push it to a success, but not neglect his other stock at the same time.

It would be a pity to have an up-to-date stock-farm with up-to-date stock on it, and a man at the head of it that is not up-to-date; so, last of all, upon this farm I should have an up-to-date man. Primarily, the foundation of an up-to-date man and the foundation of his success is honesty—honesty of purpose, honesty in every sense of the word. The pedigree that he records is not worth the paper upon which it is written if he is not known as an honest man. And I can point out stock farms where they are growing the same kind of stock on two farms side by side, the one apparently as good as the other, but if you put that stock up at public sale the one will outsell the other almost two to one. The same pedigrees have been written for each, but there is a lack of confidence in the man who, they fear, is not an honest man. The public is quick to discern, and lack of confidence in a stockman means his ruin. So if you are going to achieve success upon a stock farm, be an honest man first.

And then I should have a cultured man, a man into whose home a stranger can go and feel that he has found a gentleman in every sense of the word, in fact, an educated man. The times are demanding educated farmers for these positions. The times are demanding that a man who is at the head of a progressive stock farm be an intelligent, honest and educated man. And if you have such a man upon such a farm I need not describe to you what kind of a home he will have. I have omitted that entirely, because with that kind of a man there will be a beautiful, substantial, cultured home, and that man is, in my judgment, the happiest man living.

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# The Future of Dairy Production.

**L. P. BAILEY, Tacoma, Ohio.**

President of the Ohio Dairy Union.

"Hope springs eternal in the human breast,
Man never is, but always to be blest."

Laying aside Pope's poetical inspiration let us consider for the moment the position and future of the dairy industry among the great agricultural interests of the country. Our last census shows above 16 million milch cows in the United States, value about 500 million dollars; value of their products, milk, butter and cheese, $500,000,000, a grand total of one billion dollars. The farm lands and equipments representing this industry will be several times this amount. Estimating one man to ten cows, requiring the labor of nearly two millions of our population. This labor must be performed 365 days each year, is not excessively hard labor, but confining: in many departments requiring special training and superior skill, such as in other callings command large salaries. I am sometimes inclined to think the dairyman a natural product, a born dairyman, not a made one.

It is very rare indeed that a man or family engaged in any other line of business can change suddenly to dairying and be successful. The last decade has seen hundreds of creameries, well equipped, established in communities not accustomed to dairying, a very large per cent of them failing, while in other communities long engaged in the business with no better facilities we see every indication of success.

**Combination.**

The tendency of all business interests is now towards combination. Of all interests that of dairying seems to be the least adapted to uniting all branches under one head into one vast concern. Such dairy ventures have in most instances proved a failure. Many citizens of Pittsburg will remember to their sorrow the Sewickley Dairy Co. with its nearly half a million dollars capital, establishing a plant for the production of dairy products and supplying the trade of Pittsburg. After two or three years' experience it wound up its business almost a total loss to the stockholders. Many similar ventures in other parts of the country can be named with the same results. The future of the dairy industry seems to be largely with the small farmer, with a family of children growing up in the business, willing to apply themselves systematically and intelligently, affording ample time for the thorough education of the growing children and teaching them systematic habits that will be of great value to them in after life in any line of business. To such, I think, the dairy industry has a profitable future. Every article commonly known as dairy products is a staple article and should be used daily on every table of our 14,000,000 families in the United States. Analysis shows that the nutrition in milk at the prevailing market price is much the cheapest of our food products, a most wholesome and healthful food itself, and a necessary component part of the most of the best food compounds. For an article so universally used, as its properties become better known and producers and dealers by cheaper refrigeration and improved methods of handling place it at the door of the consumer in a more cleanly and wholesome condition, the demand must increase and the price keep pace with the demand and improved quality. The dairy business is perhaps the most self-regulating of any of our agricultural interests. The work being so confining if the supply should be so great as to reduce the price below the cost of production, or other interests show larger margins of profit, many farmers will drop out, thus lessening the production and the price will naturally increase, and he who sticks to the business will be the most successful in the end. We are passing through such a period at this time. Owing to the high prices of beef cattle prevailing for a few years very many of our dairy farmers have disposed of their cows in some way and taken up the rearing of beef cattle, so that at this time there is an actual scarcity of dairy products in our large markets, and prices are advancing. The immediate future is certainly very bright for the intelligent dairyman.

**Can Produce Butter Cheaper than Beef.**

In an address in 1892 the writer said, "The cheap lands of the West and Southwest are now and will for generations to come supply our beef markets. These countries are not adapted in their present condition to dairying, hence the dairy markets must look to older sections for supplies. With a special dairy cow we can produce a pound of butter at less cost than a pound of beef. Allowing 20 cents for butter and 8 cents for beef we have a profit of 12 cents in favor of the cow. There are many herds producing 300 lbs. of butter per year for every cow in the herd, which at 20 cents per pound equals $60. Allowing $30 for feed (skim milk and buttermilk will pay for attendance) we have a net profit of $30. Our lands in Ohio and Pennsylvania are admirably adapted to dairying. All the tame grasses flourish here and along every ravine and valley flow abundant streams of pure water. Is it not a fact that for the last five years we have been raising beef cattle at a loss and can we see any encouragement in taht linle in the near future?" This prophecy was applicable to the year 1892. I believe that our friends, the beef producers, will agree with me that the situation is fairly stated and that for three or four years after there was so little profit and less life among the associations of breeders of beef cattle that none of them during this period had the courage to appear before a farmer's institute or agricultural convention and plead for the supremacy of the steer, but along about '98 or '99 all this was reversed, breeders of beef cattle everywhere had a smile on their faces, wore better clothes, bought butter and cheese from the dairyman for their tables and were generally happy.

**Counterfeits.**

Previous to this period the skill of the chemist had discovered that by a combination of the fat of the steer, hog and cottonseed oil with a small part of butter, cream or milk imitation products could be made that resembled butter and cheese, the first called butterine or oleomargarine, the second filled cheese. With the introduction and fraudulent sale of these products began the decline of the dairy industry. The sale of skim cheese on our domestic and foreign markets was so disastrous that it threatened to destroy all demand for American cheese. In 1894 the United States exported cheese to the value of only $7,180,000, a decrease in 14 years of 40 per cent. In 1894 Canada exported cheese to the value of $15,500,000, an increase in 14 years of 400 per cent. Farmers, dairymen and business men seeing this, appealed to Congress for the passage of a bill prohibiting the manufacture of filled cheese. After the passage of this bill its manufacture was effectually stopped. The same condition prevailing in the butter market has aroused a sentiment among over one-half our population who are now appealing to Congress for a bill to effectually prevent the sale either on the table or on the markets of this product for genuine butter. This bill is known as the Grout bill, which places a tax of 10 cents per pound on all oleomargarine colored yellow, repealing the two cent tax now existing and exempting that in its natural white color from any tax. The coloring matter does not affect the product either in flavor or grain and by placing it on the market in its natural white color purchasers will know it, thus preventing the dishonest dealers from selling it for butter and at butter prices. Then it will be sold on its merits and at its true value. It is made yellow in color so that it can be sold for butter. True coloring matter during portions of the year is added to butter to keep it a uniform color the year round, that of June or grass butter. The natural and original feed for cows is grass which in its green stage produces a yellow colored butter. But it is always sold as butter. Manufacturers of oleomargarine have imitated every form of package, name and trade mark known to represent the best brands of dairy and creamery butter. During the Industrial Parade in Columbus, Ohio, two years ago the Capital City Dairy Co. of that city borrowed, begged or hired a herd of Jersey cows, which were led in the parade by the uniformed help of that oleo factory with deceptive banners to represent an industry to which of animal creation the Jersey cow was the least appropriate. An insult to her, a deception to the people! Thirty-one states have laws prohibiting the manufacture or sale of oleomargarine colored yellow. The constitutionality of these laws has been upheld by the Supreme Court of the United States and many of the highest state courts and none has declared a reverse decision. It seems impossible for state officials to enforce these laws and colored oleo is openly sold on our markets. It is believed the only remedy is a national law similar to the Grout bill.

It is claimed by the friends of oleomargarine that there is not enough butter produced and that the price would advance beyond the purchasing power of the poor. We answer: assure the farmer that the future price of butter will give him a fair profit for labor and capital, the supply would soon increase so that its own competition would keep the price within the reach of all, giving an equal distribution of labor and capital in the different industries, making all more profitable. Our Secretary of Agriculture is doing much to introduce our dairy products into foreign countries but unless our exporters send honest goods true to name and of best quality his work will avail nothing.

**A Word of Encouragement.**

Discouraging as the conditions I have portrayed seem, yet I see much in the future to encourage the intelligent dairyman. This competition has caused those continuing in the business to put more thought into the work. Dairy schools now exist in many states, doing a grand work, teaching better methods in the manufacture and care of dairy products, feeding and care of dairy stock. The agitation of the Grout bill last winter was a campaign of education, enlightening the public in the practices of the oleomargarine dealers. Whether the bill passes this Congress or not the results will be beneficial to the dairy interest. Those best informed think the bill will pass. The future dairy farmer must make his products so wholesome, quality and condition so attractive as to defy competition with any imitation. The imitation cannot equal the perfect genuine article.

The consumption of milk and cream is rapidly increasing in our cities, drawing supplies from large sections heretofore producing butter and cheese. This demand is practically unlimited, depending only on the ability of the dairyman to furnish a pure, cleanly, palatable article. The same will apply to the best quality of butter and cheese. Good quality means good prices. The best means the greatest success. It is the privilege and duty of dairymen to demand of our legislative bodies adequate laws that will protect our just rights, but our first duty is to make every effort that care, science and skill can do to improve our products and place them on the markets in an attractive form. Then they will command remunerative prices, assuring larger profits than most other agricultural interests. A few years ago the smoke from our factories and mills almost ceased, the hum of creative industry was stilled, labor appealed to charity for help. Political economists told us that this condition was caused by a lack of confidence—not that the needs of the world were less but capital feared that the world would not want its products. The present was gloomy to all, the future seemed more so. We may well compare the dairy market of the world with this picture. Our products have been carelessly made, fraud and deception so prevalent that the consuming public has lost confidence. Convince the people by honest merit in our products that they are better than the imitation and are carefully and skillfully made from the cow to the table, then confidence will be restored and greater things are in store for the dairy industry than were ever dreamed of.

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# Management of a Herd of Pure-Bred Swine.

**S. H. TODD, Wakeman, Ohio.**

It gives me great pleasure to meet with and address the breeders of Pennsylvania on a topic which has so much of importance connected with it. The first thing which is necessary to know in handling a herd of pure-bred swine is what formation it should have to give the best results. I would have my breeding animals long in body, square in form, broad backed, with arched ribs, great depth, insuring a good cut of bacon; wide between the legs, flank thick and well let down, to make the under line parallel with the upper. Legs short and so set under body as to enable them to carry their great weight with ease. Breeding hogs especially should stand well on their feet. The breaking down in the feet is a serious objection, and should be guarded against. Said breeding hogs should have excellent hams, coming well down over gambrel joint. For a coat I prefer straight, fine hair. The head should be short, face broad, and slightly dished; broad between the eyes and on top of the poll. This insures great brain capacity. A hog without a good, active brain is worthless as a breeder or feeder. Neck should be short, wide on top, with a good crest. All hogs built in this way are not a success. Still the majority of them are. I would next notice prolificacy.

There is not a breeder of swine before me today but what knows it doesn't pay to keep a brood sow to have twins or triplets. And I may say this has become too common in the herds of swine owned by our best breeders. To avoid shy breeding great care in selection will be necessary. Select the male and female from a litter of not less than ten pigs, and I would rather have twelve. Brood sows should be large and roomy, making better mothers, better sucklers and more satisfactory feeders. There is a fad going the rounds that you should have the brood sow large and open, and the sire more compact. This if followed out will prove very deleterious. Especially so to the efficient breeder, that has an eye to a good hog. If this line of breeding is followed, you will destroy uniformity of size and general characteristics. For example if the brood sow is one type and the sire another their pigs will usually be quite even in size dividing size between the male and female. But the trouble comes when you breed these pigs. Some of their progeny will follow the grand dam, some the grandsire, and others will present four or five different sizes between. I would say by all means have the sire and dam as near alike in size and characteristics as possible. I shall next consider the feed.

You will understand me I am recommending feed for pure-bred breeding stock. I would graze the breeding animals both male and female on bluegrass pasture if I had it. If not I would graze them on clover and bluegrass. I would be very shy about pasturing them on clover alone. We have had some very unfavorable results with breeding hogs that had run on clover pasture. The grain ration I would feed in a slop, made from two parts meal, two parts middlings, and one part bran. I would make slop thin so as to lessen nutrition in proportion to bulk, and then be able to fill animal's stomach, without its becoming too fleshy. Besides a plenty of water keeps sow from becoming constipated, aids digestion, and brings about a contentment which is very beneficial to the brood sow. While I would feed the male the same kind of food, I would make it a little more nutritious to the bulk.

Brood sow should have a good, well-ventilated sty for her sleeping quarters. Size 8x10 feet. It should have one slant roof, and be sided up with boards 5 feet long on the one side, and eight feet long on the other. Have two one-sash windows in the eight-foot side, and have the windows such a height from floor as to let the rays of the sun fall on the brood sows hen in the sty ith her little family. It must be borne in mind that there is nothing so beneficial to health as the sunlight. Especially will this be true in the short days of winter. For our large and clumsy brood sows we usually put a shelf about 14 inches wide around the pen 14 inches from the floor. This makes a hiding place for the pigs where they will secrete themselves from being overlaid or tramped on.

Every breeder should make note of when sow is served and then be on the lookout at the expiration of 112 days. A little attention at this time often gives a large profit of actual cash. Little pigs are very peculiar, and know more at 8 hours of age than any other living thing at the same age, so far as my knowledge goes. Remember there are ten of them. They are all located at the udder, land surveyed, and stake set. And no intruder is allowed over line. If two have located at the same teat, there is war, which will result often, in the death of half or more of the pigs. When the mother lies down to feed the little fellows the warfare goes on. The youngsters don't care whom they bite, and the tender udder is lacerated to the extent that the brood sow won't stand it. She gets up, talks to the little fellows, tells them how wrong it is to quarrel, and askes them to be quiet. Irritated as she is, she is quite likely to throw herself carelessly down, and kill three or four of the pigs. Breeder should be there at first to render assistance. If there is an unoccupied place at the udder, he should put one of the quarreling brats to this place, and see that he stays there until he gets his hunger satisfied. And then that will be his farm, and no further trouble as a rule will follow.

You ask me how I would handle pigs so as not to irritate the mother. I am aware as most people handle them there would be trouble. Jumping over and grabbing hold of pig with both hands, to remove him to the unoccupied place, is sure to run the squeal out of him, and the "would-be helper" is getting out of the pen faster than he went in. Quite likely he is leaving some of his pants behind him, as a memorial that he had been there. God has put a handle on the pig, and if we know enough to take hold of it he will never offer a peep until he is eight days old. That handle is the tail—take him by the tail. Next comes the feeding of the brood sow while she is suckling her young.

For the first eight days she should be fed very light food, made into slop as thin as milk. Feed should be bran, corn and middlings. Half the bulk bran. After the eight days the slop can be considerably thicker and richer. Let the little pigs learn to eat quite young. Have a little department for them where they may go by themselves and eat without being disturbed by the mother. Give them a low, shallow trough. For feed make a slop of two parts middlings and one part corn meal. Salt the feed a little and make the slop thin. Remember that you have got to feed a pig what he relishes if you would have them do well. (In fact any animal.) We make a great mistake right here in not acquainting ourselves with the likes and dislikes of animals in the food they eat. Especially is this true of the young. You take a ration of food to an animal, and if he likes it saliva starts before he eats a mouthful; showing that the machine of digestion is ready for work. Don't feed a little pig bran. He don't like it. In fact he will hardly eat it at all, unless you put molasses on it, which you can't afford to do. Give the sow and pigs a run on clover or bluegrass. Keep quarters clean. Don't bed them on oat straw. Rye straw is the best. Next is wheat straw. As they get older corn stalks make a good bedding.

Wean pigs when about ten weeks of age. When you wean them feed them their usual amount of feed in the usual place, and while they are eating, drive brood sow a distance away, so that she cannot be heard by the pigs, or the pigs heard by her. There will be no check in their development and they won't mind the change.

In the discussing of this question I first noticed formation, second characteristics, third feed, fourth quarters and fifth management at and after farrowing.

Thanking you for the excellent attention you hae given me, I wish you the greatest of success in the management of your breeding stock.

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## Breeding and Feeding Pure-Bred Stock.

### PROF. GEO. C. WATSON.

Professor of Agriculture at Pennsylvania State College.

The program announces that "Breeding and Feeding Poultry" will be the subject of this paper. In preparing it, however, the writer thought best to treat some of the fundamental principles which underlie the improvement of other classes of live stock as well as poultry, as breeders of all classes of live stock are necessarily confronted more or less by the same difficulties and each must overcome them according to his best judgment. The discussion is therefore intended to include several of the classes of farm stock that are reared in Pennsylvania.

Since the earliest times of which we have any record, breeders of live stock have made attempts to improve, by the art of breeding, the quality of the animals under their charge. It is undoubtedly true that at the time the earliest records were written the art of breeding was in its most rudimentary form and the efforts of the breeders were comparatively feeble ones, as very few of the laws of transmission which we now recognize as of great importance were then known. Without doubt one of the earliest observed differences in the animals, which led to attempts in the improvement of future generations, was the variation of the individuals of the flocks or herds. Some animals undoubtedly were recognized as being of more value for the purposes for which they were kept than were other animals of the same flock or herd and it was the desire of the owners to breed from the most valuable ones.

One of the earliest recognized principles of stock breeding of which we have any knowledge is that animals "bring forth after their kind." This seems to be one of the earliest recognized laws of nature and at a very early time it was applied as one of the rules for perpetuating domesticated animals. This law was expressed by the ancients as "like begets like." It has come down to us through centuries of time and has always stood as foremost among the recognized principles of transmission that were well defined, and even today it is probably of more practical importance than any other principle recognized by successful breeders. Histories of the earliest times mention no principle of breeding that was recognized at an earlier date than this one. While this recognized law of heredity was the foundation of the practice of the ablest breeders it has controlled continually, to some extent, as it has come down to us through the many centuries of time, the value and importance of the domesticated breeds. This principle is held to be of more importance today, if possible, than at any time in the past. It was this, without doubt, that led to the recognized value of lineage and of written pedigrees at a very early date. While the ancients undoubtedly failed to give to lineage its true importance, yet it is well known that in some instances much stress was laid on the lineage of some parents in the human family and it is reasonable to suppose that animals were also valued on account of their lineage, although, perhaps, to a much less degree.

The earliest recorded pedigrees were undoubtedly very imperfect, yet they served a useful purpose and without doubt proved to be of considerable value

in the improvement of domesticated animals. It is true that this improvement in many instances was lost through adverse conditions under which the animals were maintained. Undoubtedly, in times of plenty, some flocks and herds were materially advanced in usefulness owing to superior food and the management of the most skillful owners. This improvement would of necessity be largely lost under adverse conditions in times of war and famine.

It is now recognized everywhere that breeders of stock desire to possess animals descended from individuals of merit that have been specially noted for some useful purpose. It was this same desire that gave value to lineage at a very early date.

As individuals of the human family were respected and perhaps revered as descendants of noted personages who were recognized as the foremost leaders, so animals were valued because they were dscended from those that were most highly prized. It is reasonable to suppose that more or less value was placed on the lineage of domesticated animals before written pedigrees were known. The desire to possess animals whose lineage could be traced to famous animals without doubt stimulated the development of written pedigrees. The recognized fact that offspring are like their parents, or descendants like their ancestors, has enhanced the value of those animals whose pedigrees could be traced directly to progenitors of special merit.

The development of the theory of heredity undoubtedly came from a somewhat close observation of animals in domestication. It is probable that if man had depended solely upon his knowledge or observation of wild animals and of mankind, he would never have developed or enunciated what we now recognize as the law of inheritance. Wild animals resemble their parents so closely and so uniformly that one would have said that this law is self evident and that any considerable study would not be likely to produce commensurate results. While animals in the state of nature resemble each other closely yet they vary more or less according to the conditions under which they live and according to the species. Some species vary more than others. All the higher classes of wild animals have distinct characteristics which are sufficient for these animals to distinguish one individual from another but it is only when we study domesticated animals closely that we are able to see differences in the individuals that it seems at all worth while to give this law our best thought and study. We know that individuals of the human family resemble each other. A description of the characteristics of one man would describe many men. Yet having seen a face once we can recognize it among thousands at any time or in any place. While we recognize marked resemblances we are always able to detect comparatively slight differences without difficulty. Be the differences what they may the law that offspring must resemble their parents is a foundation principle upon which the improvement of all breeds of live stock depends, and one upon which we always depend and one which serves the breeder a most important purpose. Were this not true the improved breeds would be robbed of their superiority. The progeny of superior animals inherit the desired characteristics of their parents and are therefore more highly prized on account of their superior parentage. It is this recognized fact that gave the enhanced value to the so-called improved breeds. Because these animals have the power of transmitting their desirable qualities to their offspring they are more valuable for breeding purposes than are those individuals which do not have their desirable characteristics developed to so great an extent.

The tendency to vary in domesticated animals has made it possible for the law of heredity to be of the utmost importance. Animals that show a tendency to vary along a line of improvement and have the power of transmitting these desirable tendencies become most valuable as individuals to perpetuate their kind. Were it not possible for an animal to be better than its parents improvement could never be realized. Improvement must come through desired variation. The conditions, therefore, which induce variation are of the utmost importance to the improvers of live stock and also to those who desire to maintain the improvement already attained. Oftentimes it is noticed that in large flocks or herds there are certain individuals that have the power of well doing developed to a far greater degree than is manifest in the others. In other words these animals appear to have the power of making better use of the food which is given them under the conditions under which they exist than do the average individuals of the flock or herd. It is to the breeder's advantage to further develop and to perpetuate this desired tendency. He desires to increase these valuable characteristics to their fullest extent and maintains these few animals under superior conditions as to food and environment. He is fortunate if these animals have the power of transmitting this improvement to their offspring and is thereby able to secure an improved race or breed, or family, as the case may be. In the improvement of breeds food has been a most important factor. Practically all improvement has come through desired variation which in a large measure was due to the improved conditions under which the animals were maintained. It is true that skill in mating breeding stock has been a potent factor in developing desired variation but the tendency to improvement is promoted by the skill of the breeder and is not originated by it. Animals that have the power to make the best use of the food which they consume are most valuable. Animals of improved breeds are more economical than those that are unimproved. In other words they have the power of making better use of the food which they consume, particularly if that food be sufficient to further develop the improvement or even to maintain that which has already been secured. It is a noteworthy fact that without exception all of the great breeders have been excellent feeders. It should not be forgotten that the improved breeds are the most economical when maintained under superior conditions. Without doubt one of the greatest causes of disappointment to those who invest in improved breeds for the first time is due to the failure to recognize the importance of improved feeding. They do not realize that improved flocks and herds have been brought up to their present high standard of usefulness through improved conditions of living. These animals have been better fed, they have been better housed, they have been better cared for in every way than have those that are unimproved. This improvement in the food and care has been a great factor in bringing these animals to their present high standard of usefulness.

Farmers who have kept their stock in what may be called the "ordinary way" do not realize that superior food and care are required to improve our domesticated animals and that superior food and care will be required to maintain that improvement. It cannot be expected that improved animals will maintain their good qualities unless they are given the conditions that were required for their improvement in the hands of skilled men. If the best of our animals are kept under unfavorable conditions deterioration will immediately follow. The farmer who purchases pure-bred animals from an improved herd of his neighbor and maintains them as he has maintained his common stock is likely to be disappointed. He says that the improved animals if good for anything will do better than those which he has been keeping. He says that he does not believe in pampering them and will give them the same care and food that has maintained a herd of common stock on his farm for many years. He is pleased with the animals at first, they are able to do better for a time than the common stock which he has kept so long. The next generation of pure-bred stock is somewhat disappointing, the third and fourth generations show more marked deterioration an dthe man becomes convinced that pure-bred stock is no better for him than the hardy stock which he formerly kept. Now, the practical point is this: We cannot expect good animals to maintain their improved qualities unless they are maintained under improved conditions and given a bountiful supply of suitable food. The most economical producers will deteriorate under unfavorable conditions. Pure-bred animals are valuable because they will do better under improved conditions than will the more hardy common stock, the hardiness of which has been developzed at the expense of useful qualities. Unless a farmer who is breeding common stock can provide better food and give better care he will not be able to build up a satisfactory herd of improved stock. It is true that the common stock of the country are of as high a grade as the care and food which they receive will maintain. If new and better animals are put in their places they will do better for a while, for the improved animals have a certain amount of reserve force stored up which may be drawn upon for increased production for a time. but deterioration will inevitably follow. A man who gets a herd or flock of improved animals generally is satisfied with them at first. He perhaps does not give them any better care than he did his other animals. After a year or two he gets their offspring which most of them, will be inferior to their parents although many of them, probably the most of them, will be inferior to their parents. In the course of a few generations the pure-bred animals are practically no better than the common stock which he formerly kept. These animals may have the standard color and can be registered but they do not possess the desired characteristics of improved breeds.

The man who has been breeding cows for six or eight generations under practically uniform conditions, no matter what these conditions may be, will get nothing but temporary improvement by bringing new blood from outside. He will come right back to the level that his standard of food and care will maintain.

That many farmers are disappointed in improved breeds and that pure-bred stock without the improvement is continually being recorded is a matter of common observation, a condition which we all deplore, and which without doubt does more to prevent the development of the pure-bred live stock interest of the country than any other one thing. Until the majority of those who seek to improve their herds and flocks by the introduction of pure-bred stock realize that improvement in breeding is necessarily accompanied by improved feeding, disappointments are to be expected. A most important step will be taken in the promotion of the live stock interest in the country when the people who purchase and attempt to breed bure-bred stock realize that inferior conditions are not sufficient to maintain improvements.

The breeders of pure-bred stock who impress upon their patrons the value of the lineage of their animals without mentioning the conditions which have made this lineage desirable fail to make the most of their opportunities in this important campaign of education.

Breeders are brought into direct contact with their patrons and are frequently expected to give advice as to mating and feeding. They have an opportunity to impress the importance of superior food and fail to advance the best interests of pure-bred stock if lineage alone is mentioned.

Cannot the breeders of Pennsylvania unite in an effort to secure improved feeding for the improved breeds that are now maintained within the borders of this great commonwealth? Whenever the farmers realize the importance of improved feeding the improved breeds will be appreciated as they never have been in the past and their increased importance will mark a new era in the development of this great industry.

## Breeding and Feeding the Dairy Calf.

**W. F. McSPARRAN, Furniss, Pa.**

President of the Pennsylvania Dairy Union.

Twentieth century progress and twentieth century methods have no abiding place with the jack of all trades. These are times of stupendous operations and all toward a definite end. The time of general adaptability in men and machinery and animals is passing. Great manufacturers have ingeniously designed and constructed machines and tools for doing only one thing well. The old shoemaker with his low bench and assortment of awls anl pegs and lasts to fit no foot right, the old village blacksmith, the old wheelwright, and stage-coach and combined reaper and mower are figures of history. Now we have the special factories for shoes and wagons and carriages: we have the binder, the railroad flyer, the automobile, the trolley, the balanced ration and the trusts.

It is the rule of us wise men from the east to shake our heads at the benighted farmer and tell him he is slow and dull and behind the times; that he is not putting enough brains into his business and that he must get a move on or the hurrying and impetuous old world will run over him. But maybe the old fellow with hay seeds in his hair and wearing only one gallus, and that one part binder twine, it putting more brains into his business in a quiet unseen way than his critic has altogether. I am no apologist and no flatterer. I don't say that things are all right because my party is shaping the destinies of our nation or that everything is out of joint and going to the bow-wows because my party is not in. But I am a digessor, and while I am off the track I am going to bump along long enough to record it as my opinion that the farmer who is educating the girls, buying buggies for the boys while keeping expenses down and his property and his spirits up, has a pretty good lot of brains, and has them pretty active.

We farmers are a large body and we are taught large bodies move slowly. Dairying is comparatively new to us. We have always kept cows, of course, as a kind of necessary evil, but to recognize the keeping of them as a distinct line of agricultural operations grows up to us slowly, and it is well that we look into the matter somewhat when we thus come together, not that he who does the talking is of necessity most qualified to be spokesman, but because there must be some expression.

### The Future Cow.

Why the dairy calf? Because we want a calf that shall grow up into a legitimate and profitable member of the dairy. We do not want a cow that is good to look at only, or that burns the candle at both ends and drops the fat into the fire at the same time by trying to make both beef and butter in the same establishment. We want a calf that for generations and generations in the hands and under the care of skillful and careful and patient men has been bred and fed and directed to the single purpose of being a profitable dairy cow.

There are two kinds of dairies—those for milk and those for butter. If a large quantity of milk is wanted regardless of its fat content the business dairyman naturally turns his heart towards the animal that will use her feed and her energies for making an abundance of milk. If cream or butter be the aim of the dairyman, he will not care if the little cow that gives him from one to two pounds of butter fat a day gives him a gallon of milk.

It is not my intention to elaborate any argument why the dairyman wants dairy cows and not beef animals, for it appears to me perfectly clear that that question is settled, and to those who maintain that it is not settled I can only recommend investigation.

It is an inalienable right that we owe both our children and our calves that they be well born—that they come into the world with as little original sin or tendency to sin as possible. That they shall have an augmentation of the virtues of their mothers and at least a reasonable modification of the sins of their fathers. That is making a pedigree. Given a good sire and a good dam with generative performance well fixed in then the breeder has a right to expect a good calf.

Its goodness is not a matter of accident. Its virtue has been builded line upon line and performance upon performance. As I have said, men by infinite wisdom and skill and patience have brought together the elements to make the improved animal. I do not say the perfect animal. That is in the future. Not necessarily because men have evolved this cow that never goes dry nor fails in her diligent good work from the primitive mother of a calf, performing the functions of motherhood only till the offspring could spring off from her and turn the edge of hunger on the herbage of the plains, have they made an animal less robust and perfect in its constitutional vigor. They have merely brought into harmonious relations the scattered tendencies of life. No man may create anything, it is said, but he may make some beautiful combinations. He has done only this perhaps in the dairy cow.

What has been undesirable or unworthy he has cast out or neutralized. What has been good has been encouraged, amplified and fixed in a type. Again, this is making a pedigree.

### No Rules for Breeding.

But it is ever easier to tear down than to build up. Unfortunately the brains and skill of the makers of pedigrees do not go with the pedigrees, and the red-lettered pedigree is not always a guaranty of personal excellence in an individual. It is a record of what has been, a promise ef what should be, but carries no safeguard against unwisdom.

I may lay down no hard and fast rules that we may follow in breeding, or announce a formula for specific results any more than I may give a recipe for writing a poem, or instructions for painting a picture. Cow, poem, picture!—they are all works of art, and the greatest of these is the cow, for in her production man must grapple with the intangible forces of life, but when he has grown the perfect cow in her he has also a poem, with its rhythm and its rhyme and its refined mission and purpose, and the picture with its beauty to the eye and its inspiration for the mind.

Neither may one say this calf, this heifer, this cow must be fed so many pounds of dry matter and protein and carbohydrates. But the prudent breeder and the careful feeder will look well into the practices and results of those who

have made a study of the cow's creation and her living.

### The Dam.

Proper consideration must be given the cow that is to be the mother of our dairy calf. Dr Holmes says a boy's education should begin with his grandmother. So with the dairy calf, we should begin building for it as far back as possible, for as breeders we are working in the dark unless we recognize the power of heredity. I am sure I would be only threshing straw to tell such men of experience and wide reading as compose this convention how the cow nearing motherhood should be fed and handled. Suffice it to say I never practice starvation tactics. The appetite of the cow should be so satisfied as to insure her comfort and repose. Her feed should be wholesome, nutritious and laxative. Her quarters should be clean, light, quiet and roomy.

Good practices differ somewhat among breeders regarding the first manual attention given the calf. Many remove the calf at once and dry it away from the dam. Others, equally successful, allow the calf to remain with the dam till the cow's milk is "good." The length of that time will depend somewhat generally upon whether the milk is for home consumption or whether it goes to the creamery. Personally I am such an agnostic in my habits and thinking that I am often forced to admit that "I don't know." But being a sentimentalist, I am inclined to allow the dam to mother her new born, for perhaps by the encouragement of that natural maternal affection I am working toward the more perfect establishment of the refinement of bovine maternity. It may be, as I say, only a sentimentality as affecting the heredity of the calf, but what one of us looking back to the tottering, uncertain days of childhood, would take from his pedigree the loving touch of a mother's hand? And we want all the motherhood possible in a good cow.

The careful breeder will watch each calf as an individual. He will guard against sickness and disease rather than be prepared to medicate for them.

### The Calf.

When the calf is taken from its mother it should be given clean, warm, light quarters. It must be regarded as a creation of warmth. There is no natural agent so exhaustive of vitality as cold, and just so far as cold is allowed to encroach upon the life of the calf so far has come death. Therefore the calf must have warmth, light and dryness. It shall not be overfed. Its food till the timeof its birth has been the blood of its mother, therefore the calf's milk should be blood-warm. A good cow's milk is richer than her blood, and therefore again the delicate system of the young thing must not be disarranged to a sudden and radical elemental change of food. Better a hungry calf than a sick one.

The natural food for the calf till it is old enough to begin rumination is simply whole milk diluted with water. If the calf is not worth new milk till it is two weeks old it is not in my list of dairy animals. Let the skim milk supplant the whole milk very gradually. Feed no grains or meals or mixtures in the milk. Milk itself is capable in reasonable quantities of being directly absorbed and assimilated, but solid foods should never enter a calf's stomach without first undergoing insalivation. Corn is the natural complement to skim milk and all animals like it.

Sweet, warm skim milk, discretionary corn meal, clover hay and plenty of corn silage make my ration for the dairy calf.

# OFFICERS.

## Pennsylvania Live Stock Breeders' Association.

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| President. | W. C. NORTON, Aldenville. |
| First Vice-President.. | HENRY PALMER, Avondale. |
| Second Vice-President | M. P. SHOEMAKER, Greensburg. |
| Secretary | E. S. BAYARD, East End, Pittsburg, Pa. |
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COMMITTEE ON FAIRS.—W. C.Black Mercer; J. L. Henderson, Washington; W. F. Holtzer, Greensburg.

## Pennsylvania Department of Agriculture, Harrisburg.

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| Secretary of Agriculture | JOHN HAMILTON. |
| Deputy Secretary | A. L. MARTIN. |
| Dairy and Food Commissioner | JESSE K. COPE. |
| Economic Zoologist | BENJ. F. MacCARTNEY. |
| State Veterinarian | LEONARD PEARSON. |

## Pennsylvania Experiment Station, P. O. State College.

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| Director | HENRY PRENTISS ARMSBY. |
| Agriculturist | PROF. GEO. C. WATSON. |

## Department of Agriculture, Washington, D. C.

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| Secretary | HON. JAS. WILSON. |
| Assistant Secretary | J. H. BRIGHAM. |
| Chief of Bureau of Animal Industry | D. E. SALMON. |
| Chief of Dairy Division | HENRY E. ALVORD. |

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# What Our Members Breed.

## HORSES.

### STANDARD BREDS

| Name | Postoffice. | County. |
|---|---|---|
| H. C. & M. R. Fowler | Cannelton | Beaver. |
| Geo. H. Fowler | Stoneboro | Mercer. |
| W. A. McCoy & Sons | Mercer | Mercer. |
| Henry Palmer | Avondale | Chester. |
| Henry H. Phillips | Pittsburg | Allegheny. |
| Watkin G. Powell | Shadeland | Crawford. |
| W. H. Ridge | Trevose | Bucks. |
| Ridge Farm (W.C.Norton) | Aldenville | Wayne. |
| W. H. Rink | Jennerstown | Somerset. |
| D. L. Stevens | Elkdale | Susquehanna. |
| W. E. Stevenson | Burgettstown | Washington. |

### FRENCH COACH.

| | | |
|---|---|---|
| Geo. Cook | Seelyville | Wayne. |
| Watkin G. Powell | Shadeland | Crawford. |

### HACKNEYS.

| | | |
|---|---|---|
| Mitchell Harrison | Chestnut Hill | Philadelphia. |
| Dr. Leonard Pearson | Philadelphia | Philadelphia. |

### CLYDESDALES.

| | | |
|---|---|---|
| H. C. & M. R. Elder | Cannelton | Beaver. |
| Watkin G. Powell | Shadeland | Crawford. |

### ENGLISH SHIRES.

| | | |
|---|---|---|
| Watkin G. Powell | Shadeland | Crawford. |

### PERCHERONS.

| | | |
|---|---|---|
| L. M. Crothers | Crothers | Washington. |
| Geo. R. Kinnan | Decker's Point | Indiana. |
| W. A. McCoy & Sons | Mercer | Mercer. |
| F. B. Stewart | Espyville Station | Crawford |

### SADDLE HORSES.

| | | |
|---|---|---|
| Julius LeMoyne | Washington | Washington. |

### SHETLAND PONIES.

| | | |
|---|---|---|
| Watkin G. Powell | Shadeland | Crawford. |
| Raccoon Farm | Bellowsville | Beaver. |
| W. H. Rink | Jennerstown | Somerset. |
| F. B. Stewart | Espyville Station | Crawford. |
| James A. Waugh | Pittsburg | Allegheny. |

## CATTLE.

### SHORTHORNS.

| Name | Postoffice. | County. |
|---|---|---|
| W L. & Geo S. Strosnider | Cummins | Greene |
| John Cummins | Cummins | Greene |
| W. C. Black | Mercer | Mercer. |
| M. I. Buchanan | Pulaski | Lawrence |
| W. G. Christley | Balm | Mercer. |
| M. A. Cooper | Washington | Washington. |
| L. Donthett | Thornhill | Allegheny. |
| Eagley Bros. | North Springfield | Erie. |
| Dunning Hart | Washington | Washington |
| Daniel W. Jones | Wilmore | Cambria. |
| W. A. Lothers | Lack | Juniata. |
| Jas. McClelland & Son | Canonsburg | Washington |
| W. A. McCoy & Sons | Mercer | Mercer. |
| R. L. Munce | Canonsburg | Washington |
| Pa. State College | State College | Center. |
| B. L. Post & Sons | Claysville | Washington. |
| Geo. D. Rutter | York | York. |
| Lee R. Scott | Burgettstown | Washington. |
| A. G. Shaffer | Atwood | Armstrong. |
| John D. Smith | Castile | Greene. |
| S. W. Solenberger | Chambersburg | Franklin. |
| Thos. Turnbull, Jr., | Monaca | Beaver. |
| Name. | Postoffice. | County |
| J. R. Truxall | Mutual | Westmoreland. |
| R. C. Vance | Burgettstown | Washington. |
| Geo. Watson | West Middlesex | Mercer. |
| A. S. Worden | Ulysses | Potter. |

### POLLED DURHAMS.

| | | |
|---|---|---|
| Chas. Buchanan | Carlton | Mercer |
| Albert DeFrance | Sandy Lake | Mercer. |
| Horace A. Field | Wellsboro | Tioga. |
| J. G Mattern & Sons | Hollidaysburg | Blair. |

### RED POLLS.

| | | |
|---|---|---|
| D. Norman App | Selin's Grove | Snyder. |
| N. O. Brownlee | Claysville | Washington. |
| L. D. Grove | Holbrook | Greene. |
| Hon. S. H. Miller | Mercer | Mercer. |
| T. M. Shively | Mifflinsburg | Union. |
| D. L. Stevens | Elkdale | Susquehanna. |

### ABERDEEN-ANGUS.

| | | |
|---|---|---|
| Geo. Black | Plumville | Indiana |
| James Blair | Espyville Station | Crawford. |
| W. H. Rink | Jennerstown | Somerset. |

### DEVONS.

| | | |
|---|---|---|
| J. Cheston Morris | West Chester | Chester |
| Watkin G. Powell | Shadeland | Crawford. |
| A. S. Worden | Ulysses | Potter. |

### HOLSTEINS.

| | | |
|---|---|---|
| W. M. Benninger | Benningers | Northampton. |
| Mitchell Harrison | Chestnut Hill | Philadelphia. |
| J. L. Henderson & Son | Washington | Washington. |
| Miller Bros. | Stonybrook | York. |
| J. H. Page | Alford | Susquehanna. |
| Watkin G. Powell | Shadeland | Crawford. |
| W. E. Stevenson | Burgettstown | Washington. |
| Whittaker Bros | Canoe Camp | Tioga |

### JERSEYS.

| | | |
|---|---|---|
| Geo. S. Barnhart | Greensburg | Westmoreland. |
| F. C. Besler | Carlisle | Cumberland. |
| Jno. H. Burgin | Huntingdon Valley | Montgomery |
| S. P. Caldwell | Elizabeth | Allegheny. |
| Geo. Cook | Seelyville | Wayne. |
| L. M. Crothers | Crothers | Washington. |
| H. C. & M. R. Elder | Cannelton | Beaver. |
| Geo. H. Fowler | Stoneboro | Mercer. |
| C. W. Gammell | Bethany | Wayne. |
| Wm. W. Harrison | Glenside | Philadelphia. |
| Chas. W. Henry | Chestnut Hill | Philadelphia. |
| W. F. Holtzer | Greensburg | Westmoreland. |
| M. G. King | Starview | York. |
| Geo. R. Kinnan | Decker's Point | Indiana. |
| G. H. Knapp | Aldenville | Wayne. |
| J. F. Lantz & Co. | Isabella | Chester. |
| L. W. Lighty | East Berlin | Adams. |
| J. M. Main & Sons | Shippensburg | Cumberland. |
| A. L. Martin | Harrisburg | Dauphin. |
| Jas. McClelland & Sons | Canonsburg | Washington. |
| J. L. McGough | Dinsmore | Washington. |
| Wharton McKnight | Pittsburg | Allegheny. |
| W. F. McSparran | Furniss | Lancaster. |
| E. L. McSparran | Goshen | Lancaster. |
| A. S. Morrow | Plumville | Indiana. |
| J. C. Peck | Carbondale | Lackawanna. |
| Perham Bros. | Pleasant Mount | Wayne. |
| Henry M. Phillips | Pittsburg | Allegheny |
| Watkin G. Powell | Shadeland | Crawford. |
| Raccoon Farm | Bellowsville | Beaver. |
| Ridge Farm | Aldenville | Wayne. |
| R. F. Shannon | Edgeworth Station | Allegheny. |
| M.P.Shoemaker & Bro. | Greensburg | Westmoreland. |
| J. Walter Taylor | Kennett Square | Chester. |

| Name. | Postoffice. | County |
|---|---|---|
| Lewis Walker | Meadville | Crawford. |
| Edward Walter | West Chester | Chester. |
| A. P. Warren | Elizabeth | Allegheny. |
| Wm. R. Williams | Germantown | Philadelphia. |
| J. B. Wylie | Washington | Washington |

### GUERNSEYS.

| | | |
|---|---|---|
| H. C. Baughman | Pittsburg | Allegheny. |
| H. W. Comfort | Fallsington | Bucks |
| Wm. F. Gable | Altoona | Blair. |
| Prof. Harry Hayward. | State College | Center. |
| Ezra Michener | Carversville | Bucks. |
| Henry Palmer | Avondale | Chester. |
| Pa. State College, | State College | Center. |
| Nelson Poorbaugh | Mt. Pleasant | Westmoreland. |
| W. H. Ridge | Trevose | Bucks. |
| D. L. Stevens | Elkdale | Susquehanna. |
| W. S. Stevenson | Butler | Butler. |
| Hon. J. F. Woodmansee, | Lake Como | Wayne. |

### AYRSHIRES.

| | | |
|---|---|---|
| A. F. Grine | Homewood | Beaver. |
| John H. Rutter | Emigsville | York |
| Thos. Turnbull, Jr. | Monaca | Beaver. |

### HEREFORDS.

| | | |
|---|---|---|
| J. I. Barley | Baker's Summit | Bedford. |

### POLLED ALBIONS.

| | | |
|---|---|---|
| B. E. Ferris | Hector | Potter. |

## SWINE.

### POLAND CHINAS.

| Name. | Postoffice. | County |
|---|---|---|
| J. I. Barley | Baker's Summit | Bedford. |
| H. C. Bughman | Pittsburg | Allegheny |
| Burns & Adams | Clinton | Alegheny. |
| Eagley Bros. | North Springfield | Erie. |
| N ofl6iako5 bnlp | vbgkjq vgbkq vbgkqj | vbgkqmbb |
| H. C. & M. R. Elder, | Cannelton | Beaver. |
| L. D. Grove | Holbrook | Greene. |
| Daniel W. Jones | Wilmore | Cambria. |
| W. A. Lothers | Lack | Juniata. |
| D. D. Meese | Elklick | Somerset. |
| Henry Palmer | Avondale | Chester |
| A. G. Shaffer | Atwood | Armstrong. |
| A. P. Warren | Elizabeth | Allegheny. |

### TAMWORTHS.

| | | |
|---|---|---|
| F. C. Bosler | Carlisle | Cumberland. |
| Harry Hayward | State College | Center. |
| Henry Palmer | Avondale | Chester |
| Ridge Farm | Aldenville | Wayne. |
| M. P. Shoemaker & Bro., | Greensburg | Westmoreland. |

### CHESTER WHITES.

| | | |
|---|---|---|
| Geo. S. Barnhart | Greensburg | Westmoreland. |
| H. C. Bughman | Pittsburg | Allegheny. |
| J. Grier Dain | Malvern | Chester. |
| L. Douthett | Thornhill | Allegheny. |
| Jos. T. Fleming | Bellville | Mifflin. |
| J. F. Lantz & Co. | Isabella | Chester. |
| W. A. McCoy & Sons | Mercer | Mercer. |
| J. L. McGough | Burgettstown | Washington. |
| B. W. McKeehan | Mt. Rock | Cumberland. |
| J. C. Mattern & Sons, | Hollidaysburg | Blair |
| W. J. Monroe | Delmont | Westmoreland. |
| R. L. Munce | Canonsburg | Washington. |
| Raccoon Farm | Bellowsville | Beaver |
| Henry H. Randt | Pipersville | Bucks. |
| M. P. Shoemaker & Bro., | Greensburg | Westmoreland. |
| J. R. Truxall | Mutual | Westmoreland. |
| Edward Walter | West Chester | Chester. |
| A. P. Warren | Elizabeth | Allegheny. |
| Hon. J. E. Woodmansee, | Lake Como | Wayne. |

### BERKSHIRES.

| | | |
|---|---|---|
| George Black | Plumville | Indiana. |
| W. C. Black | Mercer | Mercer. |
| N. O. Brownlee | Claysville | Washington. |
| Jno. H. Burgin | Huntindon Valley | Montgomery. |
| W. G. Christley | Balm | Mercer. |

| Name. | Postoffice. | County |
|---|---|---|
| G. W. Church | Waynesburg | Greene. |
| L. M. Crothers | Crothers | Washington. |
| Geo. H. Fowler | Stoneboro | Mercer. |
| Mitchell Harrison | Chestnut Hill | Philadelphia. |
| Jas. L. Henderson & Son, | Washington | Washington. |
| W. F. Holtzer | Greensburg | Westmoreland. |
| Homer Bros. | Greenville | Mercer. |
| Harry P. Kuhn | Leetsdale | Allegheny. |
| L. W. Lighty | East Berlin | Adams. |
| W. A. Lothers | Lack | Juniata. |
| J. M. Main & Sons | Shippensburg | Cumberland |
| Jas. McClelland & Sons, | Canonsburg | Washington. |
| S. V. McDowell & Sons | Fredonia | Mercer |
| A. S. Morrow | Plumville | Indiana. |
| Pa. State College, | State College | Center. |
| Nelson Poorbaugh, | Mt. Pleasant | Westmoreland. |
| Ridge Farm | Aldenville | Wayne. |
| W. H. Rink | Jennerstown | Somerset. |
| R. F. Shannon | Edgeworth Station | Allegheny. |
| Thos. Turnbull, Jr., | Monaca | Beaver. |
| Whitteker Bros. | Canoe Camp | Tioga. |

### DUROC JERSEYS.

| | | |
|---|---|---|
| J. L. McGough | Dinsmore | Washington. |

### YORKSHIRES.

| | | |
|---|---|---|
| F. B. Stewart | Espyville Station | Crawford. |

### ESSEX.

| | | |
|---|---|---|
| H. C. & M. R. Elder, | Cannelton | Beaver. |

## SHEEP.

### DORSETS.

| Name. | Postoffice. | County |
|---|---|---|
| F. C. Bosler | Carlisle | Cumberland. |
| M. A. Cooper | Washington | Washington. |
| Mitchell Harrison, | Chestnut Hill | Philadelphia. |
| J. L. Henderson & Son, | Washington | Washington |
| Dr. W. L. McCleary, | Washington | Washington. |
| Henry Palmer | Avondale | Chester. |
| F. B. Stewart | Espyville Station | Crawford |
| J. B. Wylie | Washington | Washington. |

### SHROPSHIRES.

| | | |
|---|---|---|
| J. I. Barley | Baker's Summit | Bedford. |
| W. C. Black | Mercer | Mercer. |
| W. G. Christley | Balm | Mercer. |
| Henry C. Demming | Harrisburg | Dauphin. |
| H. C. & M. R. Elder, | Cannelton | Beaver. |
| Daniel W. Jones | Wilmore | Cambria. |
| J. F. Lantz & Co. | Isabella | Chester. |
| W. A. Lothers | Lack | Juniata. |
| James Louden | Tyrone | Blair |
| D. D. Meese | Elklick | Somerset. |
| A. S. Morrow | Plumville | Indiana. |
| Raccoon Farm | Bellowsville | Beaver. |
| S. Shaffer | Princeton | Lawrence. |
| Whitteker Bros. | Canoe Camp | Tioga. |

### LEICESTERS.

| | | |
|---|---|---|
| W. A. McCoy & Sons, | Mercer | Mercer. |

### LINCOLNS.

| | | |
|---|---|---|
| Edward Walter | West Chester | Chester. |

### SOUTHDOWNS.

| | | |
|---|---|---|
| L. M. Crothers | Crothers | Washington. |
| J. Grier Dain | Malvern | Chester. |
| W. A. McCoy & Sons, | Mercer | Mercer. |

### MERINOS.

| | | |
|---|---|---|
| Jas. Lindsey & Sons | Utica | Mercer. |

### STANDARD DELAINES.

| | | |
|---|---|---|
| S. M. Cleaver | East Bethlehem | Washington. |

### SPANISH MERINOS.

| | | |
|---|---|---|
| Geo. W. Church | Waynesburg | Greene. |
| R. C. Vance | Burgettstown | Washington. |

### BLACKTOP SPANISH MERINOS.

| Name. | Postoffice. | County |
|---|---|---|
| John M. Berry | Wylandville | Washington. |
| Wm. Berry | Washington | Washington. |
| R. P. Berry | Washington | Washington. |
| Geo. H. Fowler | Stoneboro | Mercer. |
| Dr. W. L. McCleary, | Washington | Washington. |
| R. L. Munce | Canensburg | Washington. |

### DELAINE MERIONOS .

| | | |
|---|---|---|
| Geo. W. Church | Waynesburg | Greene. |
| Lee R. Scott | Burgettstown | Washington. |
| D. L. Stevens | Elkdale | Susquehanna |

### NATIONAL DELAINES.

| | | |
|---|---|---|
| Dunning Hart | Washington | Washington. |
| Jas. McClelland & Sons, | Canonsburg | Washington. |
| J. B. Wylie | Washington | Washington. |

### OXFORDS.

| | | |
|---|---|---|
| J. L. McGough | Dinsmore | Washington. |
| A. G. Shaffer | Atwood | Armstrong |
| A. S. Worden | Ulysses | Potter. |

### COTSWOLDS.

| | | |
|---|---|---|
| S. V. McDowell & Sons, | Fredonia | Mercer. |

### ANGORA GOATS.

| | | |
|---|---|---|
| Horace A. Field | Wellsboro | Tioga. |

## POULTRY.

### PLYMOUTH ROCKS.

| Name. | Postoffice. | County |
|---|---|---|
| N. O. Brownlee (B) | Claysville | Washington. |
| H. C. Bughman (W), | Pittsburg | Allegheny |
| J. Grier Dain (B) | Malvern | Chester. |
| Eagley Bros (B & W), | N. Springfield | Erie |
| H. C. & M. R. Elder (B), | Cannelton | Beaver. |
| J. Wolf Evans (Buff), | Spring Mills | Center. |
| Geo. H. Fowler | Stoneboro | Mercer. |
| Wm. F. Gable (B. & W), | Altoona | Blair. |
| Chas. W. Henry | Chestnut Hill | Philadelphia. |
| W. F. Holtzer (B) | Greensburg | Westmoreland. |
| Daniel W. Jones, (B), | Wilmore | Cambria. |
| L. W. Lighty (B), | East Berlin | Adams. |
| James Louden | Tyrone | Blair. |
| W. A. McCoy & Sons (W), | Mercer | Mercer. |
| J. L. McGough | Dinsmore | Washington. |
| D. D. Meese | Elklick | Somerset |
| Ezra Michener (W), | Carversville | Bucks. |
| W. J. Monroe (B) | Delmont | Westmoreland. |
| A. S. Morrow | Plumville | Indiana. |
| Pa. State College, | State College | Center. |
| Nelson Poorbaugh (B&W), | Mt. Pleasant, | Westm'l'd. |
| Raccoon Farm | Bellowsville | Beaver. |
| Ridge Farm (W), | Aldenville | Wayne. |
| R. F. Shannon (W) | Edgeworth Station | Allegheny. |
| M. P. Shoemaker & Bro. (W), | Greensburg, | Westm'l'd. |
| J. R. Truxall | Mutual | Westmoreland. |
| Thos. Turnbull, Jr. (B), | Monaca | Beaver. |
| A. P. Warren (B & Buff), | Elizabeth | Allegheny. |

### LEGHORNS.

| | | |
|---|---|---|
| Geo. S. Barnhart (Buff), | Greensburg | Westmoreland. |
| H. C. Bughman (S C W), | Pittsburg | Allegheny. |
| W. P. Caldwell (Blk), | Elizabeth | Allegheny. |
| H. C. & M. R. Elder (Br), | Cannelton | Beaver. |
| J. Wolf Evans (S C B & S C W), | Spring Mills, | Center. |
| Wm. F. Gable (W) | Altoona | Blair. |
| J. L. McGough (B), | Dinsmore | Washington. |
| J. M. Main & Sons (S C W), | Shippensburg, | Cumb'l'd. |
| R. L. Munce (Br.) | Canonsburg | Washington |
| Pa. State College (Br) | State College | Center. |
| Henry H. Phillips (W), | Pittsburg | Allegheny. |
| Raccoon Farm (Br), | Bellowsville | Beaver. |
| R. F. Shannon (S C W), | Edgeworth Sta., | Allegheny. |
| M. P. Shoemaker & Bro (Br), | Greensburg, | Westm'l'd. |
| Lewis Walker (R C Br), | Meadville | Crawford. |
| A. P. Warren (Buff), | Elizabeth | Allegheny. |

### BANTAMS.

| Name. | Postoffice. | County |
|---|---|---|
| H. C. Bughman | Pittsburg | Allegheny |
| R. F. Shannon (B B R Game), | Pittsburg, | Allegheny. |
| Jas. A. Waugh (Seabright), | Pittsburg | Allegheny. |

### BRAHMAS.

| | | |
|---|---|---|
| L. Douthett (Lt.) | Thornhill | Allegheny |
| Wm. F. Gable | Altoona | Blair |
| Danield W. Jones (W) | Wilmore | Cambria |
| Penn't State College (Lt) | State College | Center |
| R. F. Shannon (Lt. and Dark) | Edgewort Station | Allegheny. |

### COCHINS.

| | | |
|---|---|---|
| John M. Berry (W), | Wylandville | Washington. |
| Henry C. Demming, | Harrisburg | Dauphin. |
| Dunning Hart (Buff), | Washington | Washington. |
| Pa. State College (Lt), | State College | Center. |
| R. F. Shannon (Lt & Dk), | Edgeworth Sta., | Allegeheny. |

### MINORCAS.

| | | |
|---|---|---|
| Wm. F. Gable | Altoona | Blair. |
| Chas. W. Henry, | Chestnut Hill (Phila.), | Philadel. |
| Pa. State College (Blk) | State College | Center. |
| R. F. Shannon (Blk), | Edgeworth Station, | Allegeheny |
| Thos Turnbull, Jr. | Monaca | Beaver. |

### GAMES.

| | | |
|---|---|---|
| Pa. State College | State College | Center. |
| Henry M. Philips (B B), | Pittsburlg | Allegheny. |
| Raccoon Farm | Bellowsville | Beaver |

### FAVEROLLES.

| | | |
|---|---|---|
| Pa. State College | State College | Center. |

### WYANDOTTES.

| | | |
|---|---|---|
| Bayard Bros. (Wh), | Waynesburg | Greene. |
| Wm. F. Gable (Wh), | Altoona | Blair. |
| Harry P. Kuhn (Wh), | Leetsdale | Allegheny. |
| Julius LeMoyne (Wh), | Washington | Washington. |
| T. E. Orr (Silver) | Beaver | Beaver. |
| Chas. C. Townsend (5 var.), | Westchester, | Chester. |
| Ezra Michener (Wh), | Carversville | Bucks. |

### BUFF ORPINGTONS.

| | | |
|---|---|---|
| W. A. McCoy & Sons, | Mercer | Mercer. |
| R. F. Shannon, | Edgworth Station | Allegheny. |

### TURKEYS.

| | | |
|---|---|---|
| John M. Berry (W Hol), | Wylandville, | Washington. |
| Henry C. Demming | Harrisburg | Dauphin. |
| Dunning Hart (M Br), | Washington | Washington. |
| W. A. McCoy & Sons (W. Hol), | Mercer | Mercer. |
| J. L. McGough (Buff) | Dinsmore | Washington |
| A. G. Shaffer | Atwood | Armstrong. |
| J. R. Truxall | Mutual | Westmoreland. |

### DUCKS.

| | | |
|---|---|---|
| Theo. F. Jager | Lebanon | Lebanon. |
| W. A. McCoy & Sons (Pekin), | Mercer | Mercer. |
| J. L. McGough (Pekin), | Dinsmore | Washington. |

### GUINEAS.

| | | |
|---|---|---|
| W. A. McCoy & Sons (Wh), | Mercer | Mercer. |

### GEESE.

| | | |
|---|---|---|
| Theo. F. Jager | Lebanon | Lebanon. |
| W. A. McCoy & Sons (W. Chi), | Mercer | Mercer. |
| J. L. McGough | Burgettstown | Washington. |

### PEAFOWLS.

| | | |
|---|---|---|
| W. A. McCoy & Sons | Mercer | Mercer. |

### PIGEONS.

| | | |
|---|---|---|
| W. A. McCoy & Sons (W Fan), | Mercer | Mercer. |

## PETS.

### BELGIAN HARES.

| Name. | Postoffice. | County |
|---|---|---|
| H. C. Bughman | Pittsburg | Allegheny. |
| Eagley Bros. | North Springfield | Erie. |
| W. J. Monroe | Delmont | Westmoreland. |

### ANGORA CATS.

| Name. | Postoffice. | County |
|---|---|---|
| Harry P. Kuhn | Leetsdale | Allegheny. |

### DOGS.

| Name. | Postoffice. | County |
|---|---|---|
| Chas. W. Henry (Collies and Irish Terriers) | Chestnut Hill (Phila.), | Philadelphia. |
| Harry P. Kuhn (Beagle Hounds) | Leetsdale, | Allegheny |
| Dr. Leonard Pearson (Bull Terriers) | 3608 Pine St., Philadelphia, | Philadelphia. |
| Raccoon Farm (Fox Terriers and Pointers) | Bellowsville, | Beaver. |
| Thos. Turnbull, Jr., (Bull Terriers) | Monaca, | Beaver. |
| James A. Waugh (Dalmation or Coach) | Pittsburg, | Allegheny. |

### COLLIES.

| Name. | Postoffice. | County |
|---|---|---|
| M. A. Cooper | Washington | Washington |
| D. L. Stevens | Elkdale | Susquehanna. |
| F. B. Stewart | Espyville Station | Crawford. |
| J. Grier Dain | Malvern | Chester. |
| Daniel W. Jones | Wilmore | Cambria. |
| T. E. Orr | Beaver | Beaver. |
| Edward Walter | West Chester | Chester. |

### AIRESDALE TERRIERS.

| Name. | Postoffice. | County |
|---|---|---|
| R. F. Shannon | Edgeworth Station | Allegheny. |

## Registry Associations.

### CATTLE.

American Aberdeen-Angus Breeders' Association—Thomas McFarlane, Harvey, Ill., secretary.

American Devon Cattle Club—L. P. Sisson, Newark, Ohio, secretary.

American Galloway Breeders' Association—R. W. Park, Kansas City, Mo., secretary.

American Guernsey Cattle Club—William H. Caldwell, Peterboro, N. H., secretary.

American Hereford Cattle Breeders' Association—C. R. Thomas, 225 West Twelfth Street, Kansas City, Mo., secretary.

American Jersey Cattle Club—J. J. Hemingway, No. 8, West Seventeenth Street, New York, N. Y., secretary.

American Polled Durham Breeders' Association—Fletcher S. Hines, Indianapolis, Ind., secretary.

American Shorthorn Breeders' Association—John W. Groves, Springfield, Ill., secretary.

American Sussex Association—Overton Lea, Nashville, Tenn. secretary.

Ayrshire Breeders' Association—C. M. Winslow, Brandon, Vt., secretary.

Brown Swiss Cattle Breeders' Association—N. S. Fish, Groton, Conn., secretary.

Dutch Belted Cattle Association—H. B. Richards, Easton, Pa., secretary.

Holstein-Friesian Association of America—Frederick L. Houghton, Brattleboro, Vt., secretary.

Red Polled Cattle Club of America (incorporated)—J. McLain Smith, Dayton, Ohio, secretary.

### HORSES.

American Association of Importers and Breeders of Belgian Draft Horses—J. D. Conner, Jr., Wabash, Ind., secretary.

American Breeders' Association of Jacks and Jennets—J. W. Jones, Columbia, Tenn., secretary.

American Cleveland Bay Breeders' Association—R. P. Stericker, Attica, N. Y., secretary.

American Clydesdale Association — R. B. Ogilvie, Chicago, Ill., secretary.

American Hackney Horse Society—A. H. Godfrey, room 50, Astor Court Building, West Thirty-fourth street, New York City, secretary.

American Percheron Horse Breeders' Association—I. B. Nall, Louisville, Ky., secretary.

American Shetland Pony Club—Mortimer Levering, Lafayette, Ind., secretary.

American Shire Horse Breeders' Association—Chas. Burgess, Wenona, Ill., secretary.

American Stud Book, Thoroughbred — James E. Wheeler, 173 Fifth avenue, New York, N. Y., registrar.

American Suffolk Punch Horse Association—Alex. Galbraith, Janesville, Wis., secretary.

American Trotting Registry Association—J. H. Steiner, room 1103, Ellsworth Building, 355 Dearborn street, Chicago, Ill., secretary.

French Coach Horse Society of America—S. D. Thompson, Chicago, Ill., secretary.

German, Hanoverian and Oldenburg Coach Horse Association of America—J. Crouch, Lafayette, Ind., secretary.

National French Draft Association—C. E. Stubbs, Fairfield, Ia., secretary

Select Clydesdale Horse Society of America—E. Bennett, Jr., Topeka, Kan., secretary.

The American Morgan Register — Joseph Battell, Middlebury, Vt., treasurer.

The Oldenburg Coach Horse Association of America—C. E. Stubbs, Fairfield, Ia., secretary.

### SHEEP

American Cheviot Sheep Society—F. E. Dawley, Fayetteville, N. Y., secretary.

American Cotswold Association—George Hardin, Waukesha, Wis., secretary.

American Leicester Breeders' Association—A. J. Temple, Cameron, Ill., secretary.

National Merino Sheep Register Association—R. O. Logan, California, Mich., secretary.

American Oxford-Down Record Association—W. A. Shafor, R. F. D. 1, Hamilton, O., secretary.

American Southdown Association—Frank S. Springer, Springfield, Ill., secretary.

American Shropshire Registry Association—Mortimer Levering, Lafayette, Ind., secretary.

American Rambouillet Sheep Breeders' Association—Dwight Lincoln, Milford Center, O., secretary.

American Suffolk Association—Geo. A. Franklin, Des Moines, Ia., secretary.

Black Top Spanish Merino Breeders' Association—R. P. Berry, R. F. D. 4, Washington, Pa., secretary.

Delaine Merino Sheep Breeders' Association—J. C. McNary, Houstonville, Pa., recording secretary; J. H. Hamilton, Canonsburg, Pa., corresponding secretary.

Dickinson Merino Sheep Breeders' Association—H. G. McDowell, Canton, O., secretary.

Dorset Horn Sheep Breeders' Association of America—M. A. Cooper, Washington, Pa., secretary.

Hampshire-Down Breeders' Association of America—Comfort A. Tyler, Nottawa, Mich., secretary.

Improved Black Top Merino Sheep Breeders' Association—L. M. Crothers, Crothers, Pa., secretary.

Improved Delaine Merino Sheep Breeders' Association—Geo. A. Henry, Bellefontaine, O., secretary.

National Improved Saxony Sheep Breeders' Association—John G. Clarke, R. F. D. 9, Washington, Pa., secretary.

National Lincoln Sheep Breeders' Association—H. A. Daniells, Millington, Mich., secretary.

Standard Delaine Spanish Merino Sheep Breeders' Association—S. M. Cleaver, East Bethlehem, Pa., secretary.

Standard American Merino Register Association—J. P. Ray, Hemlock, N. Y., secretary.

The Continental Dorset Club—J. E. Wing, Mechanicsburg, O., secretary.

### SWINE.

American Berkshire Association—Charles F. Mills, 512 East Monroe street, Springfield, Ill., secretary.

American Duroc Jersey Swine Breeders' Association—A. V. Bradick, Shelbyville, Ind., secretary.

American Essex Association—F. M. Srout, McLean, Ill., secretary.

American Small Yorkshire Club—G. W. Harris, 3409 Third avenue, New York, N. Y., secretary.

Cheshire Swine Breeders' Association—B. B. Badger, Ouaquaga, N. Y., secretary.

Standard Chester White Record Association—W. H. Morris, Indianapolis, Ind., secretary.

American Chester White Record Association—Carl Freigau, Dayton, O., secretary.

American Poland-China Record Company—W. M. McFadden, West Liberty, Ia., secretary.

Central Poland-China Record Association — W. H. Morris, Indianapolis, Ind., secretary.

Ohio Poland-China Record Company—Carl Freigau, Dayton, O., secretary.

Standard Poland-China Record Association—George F. Woodworth, Maryville, Mo., secretary.

Victoria Swine Breeders' Association—H. Davis, Dyer, Ind., secretary.

Suffolk Swine Association—W. F. Watson, Winchester, Ind., secretary.

National Duroc-Jersey Record Association—R. J. Evans, El Paso, Ill., secretary.

The American Tamworth Swine Record Association—E. N. Ball, Hamburg, Mich., secretary.

The American Yorkshire Club — E. W. Wilcox, Hugo, Minn., secretary. Records Large Improved, Middle and Small Yorkshires.

### GOATS, HARES, DOGS, ETC.,

American Kennel Club—A. P. Vredenburg, 55 Liberty street New York, N. Y., secretary.

National Belgian Hare Club of America, Incorporated—Roe E. Remington, Montclair, Col., secretary.

The American Angora Goat Breeders' Association—W. T. McIntire, 277 Live Stock Exchange, Kansas City, Mo.

## Constitution of the Pennsylvania Live Stock Breeders' Association.

The object of this association is to encourage and advance the live stock interests of Pennsylvania.

Article I—Membership. Any reputable breeder of pure-bred live stock who is a resident of Pennsylvania may become a member of this association upon the payment of the annual dues.

Article II—Association Membership. Any person interested in improved live stock, and in sympathy with the objects of this association may become an associate member by the payment of the annual dues but is not entitled to vote.

Article III—Dues. The annual dues shall be one dollar, payable (in advance) on or before the annual meeting.

Article IV—Officers. The officers of this association shall consist of President, First Vice President, Second Vice-President, Secretary, Treasurer. An Executive Committee consisting of the above-named officers and five elected members who represent the interests of horses, cattle, sheep, swine, poultry, goats and pet stock. A Legislative Committee consisting of five members. A Committee on Fairs consisting of three members. A Committee on Transportation consisting of five members.

Article V—Election of Officers. All officers shall be elected annually by the association.

Article VI—Auditing Committee. An auditing committee shall be appointed by the president at each annual meeting.

Article VII—Duties of Officers. Section 1.—The duties of the president, vice-presidents, secretary and treasurer shall be such as usually pertain to these offices.

Section 2. The executive committee shall perform the duties and transact the business of the association not otherwise provided for.

Section 3. The legislative committee shall endeavor to secure legislation favorable to the live stock interests of the state.

Section 4. The committee on fairs shall recommend to all fair associations uniform classifications for live stock exhibitions; also the single expert judge system, and the employment of the judges endorsed by the association.

Section 5. The committee on transportation shall attend to all matters pertaining to passenger and live stock transportation.

Article VIII—Expert Judges. Expert judges shall be elected at each annual meeting, and recommended to the various fair associations of the state.

Article IX—Annual Meeting. The annual meeting shall be held the second week in December, beginning on Wednesday.

Article X—Proxies. No proxy votes shall be received or counted at any time.

Article XI—Vacancies. Vacancies in committees shall be filled by appointment by the president.

Article XII—Amendments. The constitution and by-laws may be changed or amended at any annual meeting by a two-thirds vote.

# IN MEMORIAM.

## Prof. J. Fremont Hickman.

The death of Prof. J. Fremont Hickman, Agriculturalist of the Ohio Experiment Station, removes one of the best friends of the Pennsylvania Live Stock Breeders' Association. Prof. Hickman delivered addresses at two of our annual meetings and was heard with much appreciation. His ability in helping us was equaled only by his generosity in doing so. Although an extremely busy man and in poor health, he met with us at both Harrisburg and Pittsburg and on both occasions refused to accept remuneration for his services. But such generous deeds were characteristic of Mr. Hickman. Probably no better brief estimate of his character can be given than to quote the following extract from The National Stockman and Farmer:

"A close and true friend; a broad honorable big-hearted man; a Christian gentleman through and through—all this he was to us after years of fellowship, and he was no less to those who knew him most intimately. But it is our duty to refer especially to his public character, his service for agriculture in Ohio and consequently in the whole country. Prof. Hickman made no pretense of being a brilliant discoverer of new things. He was a careful, painstaking investigator. His work was done conscientiously, his results were announced only when he thought them to be conclusive, and then with conservatism. He was a safe man. He never guessed or prophesied, he sought and told the truth."

## W. Lazear Strosnider.

W. Lazear Strosnider, of Cummins, Greene county, Pa., died November 12, at the age of 39 years. For about twenty years Mr. Strosnider was a breeder of Shorthorn cattle in partnership with his brother Geo. G. Strosnider. Mr. Strosnider was a modest, quiet man whose true worth was not widely known outside of his own community; a thorough Christian gentleman, whose death is a great loss to his own community and to the Shorthorn interests of Western Pennsylvania. He had been for two years a member of this Association.

## James McClelland.

James McClelland, of Canonsburg, Pa., died at his home March 1, 1902, at the age of 65 years. Mr. McClelland was for many years one of the foremost breeders of fine-wool sheep in the state, and was at the time of his death the President of the National Delaine Sheep Breeders' Association. Mr. McClelland showed great skill in producing high-class stock and was in all relations an honorable and conscientious man, who will be much missed by the breeders of the state. He was a member of this Association, though he was not permitted to attend its meetings.

END OF YEAR

Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1902

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1902

Master Negative Storage Number: MNS# PSt SNPaAg057.2

# 1902

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BULLETIN No. 9 of

# THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION.

## PROCEEDINGS and PAPERS of THE FOURTH ANNUAL MEETING, HELD AT HARRISBURG,

December 10 and 11, 1902.

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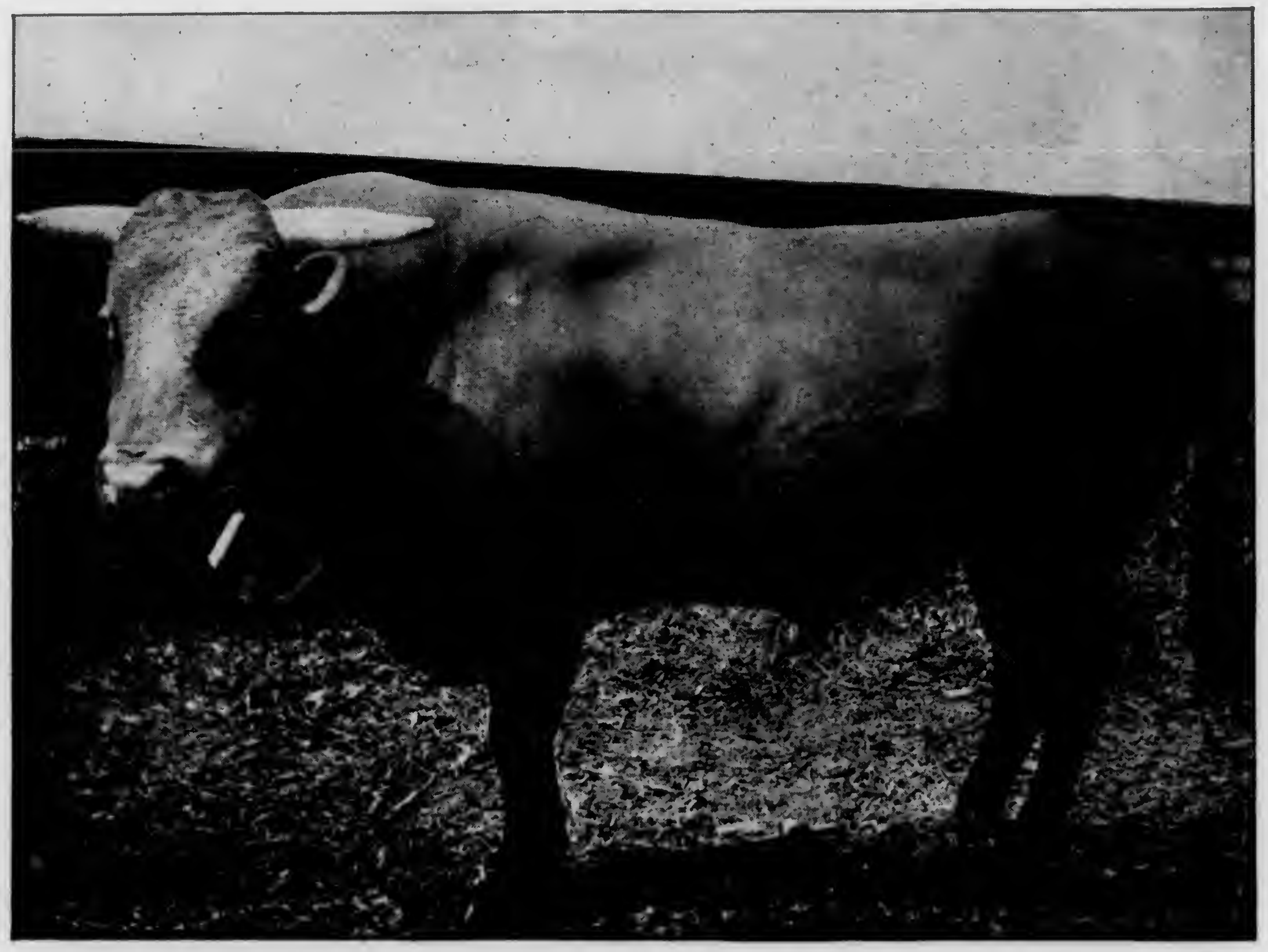
Importer and Breeder of
Devons and Berkshires



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BIRMINGHAM ROAD,
WEST CHESTER, PA.

At Home, Thursdays.

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*...Stock Farm.*

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Breeders of A. J. C. C.
Jerseys, Tamworth Swine
Brown Leghorn and
White Plymouth Rock
Chickens.

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**Pedros Royal Son 46795**—Sired by Pedro 3187, Champion Sweepstakes Bull at the World's Fair, Chicago, 1893, and sire of 45 tested daughters. Dam is a grand dairy cow by Pedro's Royal Marjoram 28560, sire of 8 tested daughters from 14 lbs. 6 oz. to 21 lbs. 4 oz.

**Pedros Flora Marigold 54564**—Sired by General Marigold 54486, owned by Mr. Geo. Vanderbilt, Biltmore Farms, N. C. General Marigold is a son of Mary Idagold, 23 lbs. 9 oz. and grandson of Ida Marigold, 25 lbs. 2½ oz. in 7 days. Champion winner at the World's Fair.

**Young Golden Lad**—Is a double grand son ot Golden Lad, first prize over Island, Aug. '91, most prepotent bull the Island produced. Sire Golden Lad's Champion, first prize over Jersey, April '99. Champion winner April '99. Beating among others the champion winner of '98.

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Guernsey Cattle, Shropshire Sheep, Chester White Hogs, Shetland Ponies, Buff and White Wyandotte, Buff Cochin, Light Brahma, Barred Plymouth Rock, White Leghorn and Black Minorca Poultry.

Our stock is selected from improved strains in their line.

We have Guernsey Bulls and Bull Calves for sale, also Shropshire Rams and Ram Lambs from Imported sires. Chester White Pigs of both sexes. Buff Wyandotte Cockerels $2 to $5. Eggs from Buff Cochin and Light Brahma $1.50 for 15. Other breeds $1.00 for 15.

**Information and Prices Cheerfully Given.**

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**Polled Durham Cattle and Chester White Swine.**

We breed both strains of Polled Durham Cattle, single and double-standard. Our herd has descended from Scotch blood and are low-down blocky animals.

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**Farms located at Hollidaysburg on the P. R. R. Breeding Stock for sale. Correspondence solicited.**

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**FURNISS. PA.**

We keep Jerseys as a business proposition and make it pay. Our cows are the best we can afford and we try to improve them. PEDRO OF FAIRFIELD 50626, a son of Old Pedro, heads our herd and does his best. When you want good Jerseys write

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**FURNISS, PA.**

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## BARRED PLYMOUTH ROCKS.

**28 YEARS A BREEDER.**

Can sell you as good birds as any breeder. Can furnish Single Birds or Mated Pens at fair prices that cannot be excelled for size, shape and plumage.

**NOTHING EXCELS THEM.**

My breeding yards this year are the finest I have ever had. Eggs $2 ⅌ 15, 26 for $3, $5 ⅌ 100.

**Also PEKIN DUCKS of high quality, Rankin strain.**
Eggs $1.00 per 13.

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Breeder of **CHESTER WHITE HOGS and BARRED PLYMOUTH ROCKS.**

I breed the original type of **Chester White Hogs,** the large, strong, hardy, early maturing, profitable kind.

My stock has been carefully selected from the oldest and best line bred herds in the locality in which the breed originated, their characteristics are firmly established, and they breed true to type. Pigs all ages, both sexes, not related for sale.

My **Barred Rocks** are **Farmer** strain, hardy, quick maturing, and good layers. Choice birds for sale at all times, and eggs in season. ☞ **Correspondence solicited, satisfaction guaranteed.**

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## OF
# SHROPSHIRE SHEEP

**J. F LANTZ & CO., Barneston, Chester Co. Pa.**

**Importers and Breeders of Shropshire Sheep, Breeders of Jersey Cattle, Chesterwhite Hogs, Barred Plymouth Rocks and Pekin Ducks. . . . .**

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Waterside Flock of Shropshire Sheep was founded in 1888 on imported ewes. Only the best and most carefully selected imported rams, from the flocks of Wm. Thomas, Wm. Ward, A. E. Mansell, T. G. Juckes, Harry Williams and David and Thomas Buttar have been used in this flock. Every ewe is sired by an imported ram and bred to an imported ram.

We now have at the head of the flock the imported ram "White Plume" bred by Thomas Buttar, sired by "Buttar's Reserve," a winner at the "Royal Show" in England, and hired one season for a flock of 50 ewes for $750.00. The dam of our "White Plume" is by that noted sheep "Bonny Beau" the sire and grandsire of many winners, and a sheep which has stamped his fashionable and aristocratic characteristics on many of the best flocks of England.

"White Plume" is one of the best and finest breeding rams in America.

"White Plume" sired the lambs winning 1st. prize at the New York State Fair in 1902, in competition with the best flocks in America, and some imported flocks.

We furnish certificate of registration and extended pedigree with each sheep sold. Correspondence solicited.

J. F. LANTZ & CO., Barneston, Chester Co., Pa.

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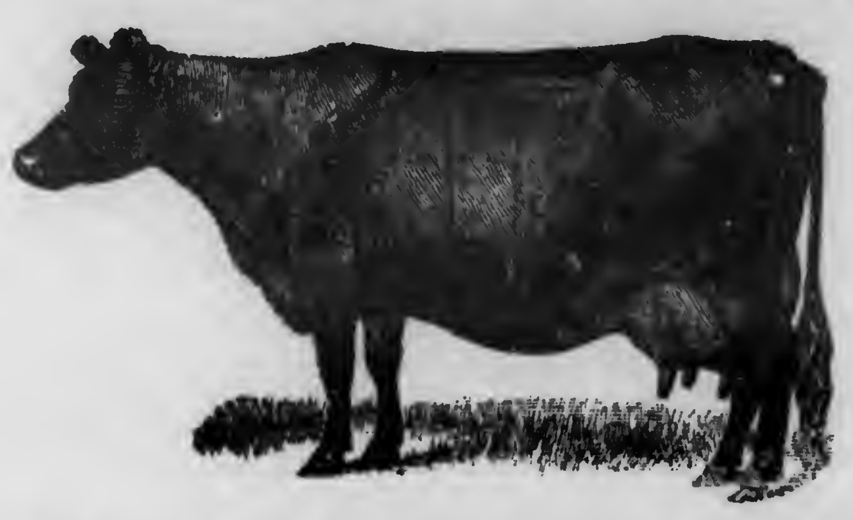
BROWNLEE 1736.

# *Homestead Stock Farm,*

**N. O. BROWNLEE, Breeder and Shipper of the Finest Strains of Registered**



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PLYMOUTH ROCK CHICKENS,
BERKSHIRE SWINE.

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Wheeling and Pittsburg Division B. & O. R. R

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# America's Leading Horse Importers!

Ours were the

## FAVORITE PERCHERONS

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## LIVE STOCK EXPOSITION,

CHICAGO.

Five of our importation won FIRST. Another one of ours won **CHAMPIONSHIP.** Our stallions won TEN out of a possible SEVENTEEN prizes. Our French Coach Stallions won EVERY FIRST prize at the great Chicago Horse Show. With our Percheron and French Coach Stallions we won EVERY FIRST prize at the Iowa State Fair, Kansas State Fair, Kansas City Horse Show, Central South Dakota State Fair, and Ohio State Fair, including GRAND SWEEPSTAKES, all draft breeds competing. In France our horses were equally successful in the show ring, fifty of them being prize winners in the two leading shows. We import more and therefore can sell cheaper than anybody else.

**McLAUGHLIN BROS.,**
COLUMBUS, OHIO.

BRANCHES :—
EMMETSBURG, IA. KANSAS CITY, MO.

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# THE U. S. WINS IN VERMONT.

At the Vermont Dairymen's Association, Rutland. Jan. 6-8 1903, there were 150 entries and

THE BUTTER SCORING THE HIGHEST; 98½ POINTS

was made from cream separated by U. S. Separator, and

WON THE GRAND SWEEPSTAKES AND GOLD MEDAL.

This was not only the highest score at this meeting, but so far this season was

THE HIGHEST SCORE AT ANY DAIRYMEN'S ASSOCIATION.

## Also Wins in Maine.

At the Maine Dairymen's Association, Waterville, Dec. 3-5, 1902,

THE HIGHEST SCORE,
THE SECOND HIGHEST,
THE THIRD HIGHEST

were all made by users of U. S. Separators and included the

HIGHEST IN BOTH THE DAIRY AND CREAMERY CLASSES.

The U. S. butter had more entries and averaged higher than our "would-be competitors" and

Won 10 FIRST,
9 SECOND and
6 THIRD PRIZES.

## And in New Hampshire.

At the New Hampshire Dairymen's Association, Littletown, Dec. 2-3, 1902, there were more entries of U. S. butter than all other systems combined and they averaged the Highest and Scored the Highest in

DAIRY TUB, CLASS A,
DAIRY TUB, CLASS A-2,
DAIRY PRINTS,
CREAMERY PRINTS.

Taking 4 FIRST,
2 SECOND,
4 THIRD PRIZES.

## And at New York.

At the New York Dairymen's Convention, Jamestown, Dec. 9-12, 1902,

THE HIGHEST SCORE,
98 POINTS

Won by the DIAMOND CREAMERY Co., J. L. Hyde & Son, Prop'rs, Massena, N. Y., users of 13 No. 0, (largest size), U. S. Separators, each one replacing an Alpha-DeLaval or Sharpless Separator.

**The U. S. also holds THE WORLD'S RECORD for Clean Skimming.**

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# PROCEEDINGS AND PAPERS

OF

# FOURTH ANNUAL MEETING

OF

# THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

Held at Harrisburg, December 10 and 11, 1902.

## OFFICERS

| | |
|---|---|
| President, | W. C. NORTON, Aldenville |
| First Vice-President, | HENRY PALMER, Avondale |
| Second Vice-President, | M. P. SHOEMAKER, Greensburg |
| Secretary, | E. S. BAYARD, East End, Pittsburg |
| Treasurer, | J. F. LANTZ, Isabella |

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MAGAZINE PRINTING AND BINDING,
GREENSBURG, PA.

THE PENNSYLVANIA STATE UNIVERSITY
Library

# The Pennsylvania Live Stock Breeders' Association.

## FOURTH ANNUAL MEETING,

## Harrisburg, Pa., December 10 and 11, 1902.

Wednesday, December 10th, 7:30 p. m., the Hon. W. C. Norton, president, in the chair.

Report of the Treasurer :

OFFICE OF TREASURER.

Barneston, Chester County, Pa., March 30, 1903 :

| | |
|---|---|
| Balance in the Treasury, December 18, 1901 | $ 15 47 |
| Receipts during the current year, from Dec. 18, 1901 to Dec. 11, 1902 | 214 00 |
| Total | $229 47 |
| Expenditures from December 11, 1901 to December 11, 1902 | 210 77 |
| Balance in Treasury December 11, 1902 | $ 18 70 |

J. F. LANTZ, Treasurer.

We the undersigned auditors appointed by the president W. C. Norton, have audited the accounts of J. F. Lantz, find them correct as audited, with balance on hand $18.70.

HENRY PALMER,
W. C. PERHAM.

December 11, 1902.

Report of the Secretary :

Bulletin No. 7 is the Secretary's report.

Messrs. Henry Palmer, and W. E. Perham were appointed an Auditing Committee.

Mr. E. S. Bayard, Secretary, moved that the Constitution be so amended that the date of the next Annual Meeting may be left with the Executive Committee. Carried.

The Nominating Committee was appointed as follows:

W. G. POWELL, Shadeland, Pa.
M. P. SHOEMAKER, Greensburg, Pa.
N. NORMAN, APP, Selin's Grove, Pa.

# The American Pig and Its Improvement.

## By Prof. C. S. Plumb,

of Ohio State University.

The history of the pig in the United States for we will say the past 100 years has witnessed some most interesting changes. The parent stock introduced to America came largely from Great Britain, and to a limited extent from China. The British breeds were somewhat coarse in character, though variable in type. The Chinese pig was fine of bone, very productive of meat, and was used to improve the coarser British stock. The Berkshire and White breeds of British were narrow-backed, long-legged, and very wasteful in dressing, and lacked the refinement of the modern porker.

In the early part of the nineteenth century the farmer and stockman generally desired considerable weight in his farm animals. So far as the meat type of animal was concerned the stockman wanted size and feeding capacity. In an address before the Jefferson Co., New York, Agricultural Society in 1820 Mr. E. Bronson says: "We shall probably all agree that a hog of small bone, thick flesh and quiet disposition is to be preferred." The Plough Boy of 1820, one of our very earliest agricultural journals, contains numerous references to big cattle, sheep and swine. In the March 3, 1821, issue is an account of two mammoth hogs on exhibition in Albany, with a crude engraving of one of them. The editor in referring to them states that "the sow is half of the Grass breed and the other half Welch. She measures nine feet nine inches in length, seven feet three inches around the body and weighs 1,137 pounds. Her age was two years and two months the 8th ult. Her pig was one year and two months old on the 1st inst.........He is very elegantly built and his weight is 946 pounds. It is believed by the best judges, should he live to be as old as the sow, that he will weigh at least 1,500 pounds. These two hogs were raised in the town of Nassau, county of Rensselaer, by Robert Brown, who is an accomplished farmer."

In early times this Grass breed of pigs met with some considerable favor. Writing of this breed the editor of the Plough Boy says: "The Grass breed as we have it here, have short legs and noses, white sleek hair, small bones, and may be called a very comely, fat, indolent, good-natured sort of swine—a race of animals in which the devil would never think of entering for any mischievous purposes."

Various breeds were used in these early days that are now no longer in existence. Shepard says: "Up to 1832 these three, viz.: Parkinson (Bedford), China and Byfield, were beyond all question in the advance, although assisted more or less by the Spanish Black, African, Neapolitan, English White Suffolk, Angus and Dishley, Black Hampshire, Leicester, Short-legged and other breeds."

As emigration moved westward the various kinds of pigs kept company with the settlers, and with the development of the corn fields of the new Central West came a new impetus in swine husbandry. The census for 1840 and for 1850 showed Tennessee and Kentucky to be the leading states in pig production with Ohio, North Carolina and Virginia following after. Then Indiana, Illinois and Missouri forged to the front while the Southern states dropped somewhat in rank. With the settlement of Ohio came an apparent attempt to produce a type of pig that would be a better consumer of corn than had hitherto been the case. This resulted in the origin of the now well-known Poland-China breed, which first appeared in Warren and Butler counties in Western Ohio, the result of an amalgamation of Berkshire, Chinese, Russian, so-called Poland, Byfield, etc.

In these early days railroads were not common and pigs had to be driven on foot to market. Consequently a strong-legged, vigorous pig was a necessity. If the corn corp could be driven to market in the shape of pork a very desirable end would be gained. The work of the developers of the Poland-China seemed to secure the desired results. No other breed equaled it as a corn consumer or produced a greater amount of pork from a given number of bushels of corn. It was through this that came the desire to

Grow more corn
To feed more hogs,
To buy more land
To grow more corn
To feed more hogs.

Since these early days the breeds have become established on a somewhat firmer basis, not only in this country but also in Great Britain. The number of breeds has become somewhat reduced, and organized associations have assisted in making each breed more firmly established in type and character as the years have gone by.

In the development which has taken place in America, but more especially in the States, the pig has become fatter, more chunky and shorter-legged; while across the water a longer-bodied, narrower-backed, longer-legged type has met with greatest favor. During recent years these two types have caused more or less discussion in the live stock world, and have been referred to as the lardy type and the bacon type. The advocate of the bacon type has had a hard battle to fight, because he has appeared before an unsympathetic audience. Where the Tamworth breed has been used as an illustration it has caused a smile with derisive word from the believer in fat hogs, and converts have been slow to obtain.

It is not my purpose to offer any plea at this time for a distinctive bacon pig, but rather to direct attention to some of the weaknesses of our present American breeds, with suggestions towards improvements. For this purpose I have no hesitation in taking for my illustrations any of the breeds producing the lardy type of American pig.

No wise man can but admit that one of the most essential features of the breeding animal is the capacity of reproduction. That breed which is weakest in fecundity is least apt to maintain a permanent hold in the affections of breeders. In the breeding herd a large proportion of the profit must be derived from the increase. The sow that drops a litter of four pigs once a year, under average conditions is worth much less than the one farrowing eight. Animals of rather fleshy conformation are as a rule less productive of young than are those of leaner type. Common practive shows this. The beef breeds do not reproduce with the freedom of the dairy breeds. In the same sense the lardy pig does not reproduce to so great a degree as does the bacon type.

Unfortunately we have no statistics available to show the prolificacy of swine a quarter or a half century ago, but I have no hesitation in saying that the fat pig of today does not yield large enough litters. Each sow should farrow and raise after her first litter on an average eight pigs, and these she should be able to nurse properly for ten weeks or so. If the litter is smaller than eight, in my opinion the sow is not up to a high standard. In order to get some light on this question of size of litter the writer had an examination made of the total number of Poland-China pigs that were farrowed by many sows in 1880, 1885, 1890, 1895 and 1899. The following table shows something of the size of litter from a large number of sows. No pig averaged eight in the litter, and the average of one year for 500 sows dropped below 7. In 1887 an associate of mine at that time, Dr. A. W. Bitting, made a careful study of the size of litters of three breeds, viz.: Berkshires, Poland-Chinas and Chester Whites. A total of 2,083 litters were recorded, and it was shown by these that the average size of litter was 8.96 for the Chester White, 8.22 for the Berkshire and 7.45 for the Poland-China; while the Chester White litter raised averaged 7.62 pigs, the Berkshire 7.17 and the Poland-China 6.14 pigs of a total of 1,600 litters raised. These figures, which represent so many individuals, must be fairly representative, and are not as a whole indicative of the fecundity that is most desirable. In my travels among breeders of swine this subject of fecundity has been one of common discussion, and many unfavorable comments have come to my ears relative to the small litters so often farrowed. This criticism is an appropriate one, and in my judgment important. In certain regions of the Central West this criticism has been especially raised against the Poland-China, and I know of no other thing which is injuring the popularity of the breed so much as the criticism of weak breeding powers. This is not fancied, but real, and is a condition which just now is aiding in promoting the popularity of the Chester White and Duroc-Jersey.

It is a well-known fact that some animals and families are more prolific than others, and it behooves the breeders of pigs to study this matter of fecundity with more care, and to select out and maintain more high-class breeding sows in their herds. If it is worth while for light horse breeders to lay stress on speed records, and for Jersey cattle men to set a premium on cows that will produce 14 or more pounds of butter in 7 days, then a suggestion to swine associations along the record line will be appropriate. Why not establish a standard of fecundity for sows, an advanced registry as it were, giving special place of honor to the sow that will farrow say 10 pigs in her first litter, 12 in her second and 14 or more in her third? To be sure the wise breeder does not wish his sow to suckle 14 or more pigs, but it is easier to destroy the poorer individuals and reduce the litter to a number suited to the sow's capacity than it is to make up a deficiency. If the breeder would emphasize this feature, and would seek to breed fecundity in the pedigree, he would strengthen rather than weaken the value of the breed.

Another criticism which may justly be made of the typical high-fleshed pig of today is lack of constitution. While I am aware that some may take exception to this statement, there is logical reason for making it. As a rule thin-fleshed animals, including man, have more vitality than do those of the fat class. They are more active, get more exercise, have firmer flesh and more blood and stronger and larger vital organs. In feeding experiments in which foods productive of fat were compared with more especially muscle-making foods it was shown that pigs fed the former were defective in a measure in the amount of blood and capacity of vital organs, compared with those eating the latter foods. Indian corn, the great staple swine food of the United States, is one of our most pronounced fat-forming foods and is no doubt in a considerable measure responsible for the change in type and character of the American pig. Through itts use we have produced the most excessively fat type of pig known to the world, and this development has been undoubtedly to the disadvantage of the animal in constitutional vigor. No where is corn fed to pigs more than in the Mississippi Valley, and in no other region do we hear of such fearful fatality from swine diseases as in this. Generally speaking, where the constitution is strongest the ability to withstand disease is greatest. The pig which inherits the tendency to lay on fat to so great a degree as to always appear fat is not the best breeder, and is not the one we are most certain of landing in the market. One's success as a breeder or a feeder is not measured by the profits of one season. but by the average profits during a term of years. There are thousands of men in Indiana, Illinois and Iowa who have lost in one season from cholera nearly entire herds, wiping out the profits of years. While such a disease as this cannot be entirely averted it is safe to say anything which will give vigor to the herd will assist in repelling the disease and reducing its ravages.

This leads me to the point of suggesting that our farmers do not rely so heavily on corn as a feed, but combine with the corn more of the muscle-making, vigor-producing kinds of food. If part of the corn will be replaced with shorts or middlings, barley, oil meal or tankage profit will follow the change. Then if some of the sows of the shorter, blockier type are fitted for the butcher instead of being bred, and the rangier, deeper-bodied, not quite so wide-backed sows are bred, a more robust and I do not hesitate to say numerous progeny will result. Without question Indian corn is the most valuable of all cereals to the American stockman, and it is entitled to merit of high order, but our American hog stock has been fed thus far too exclusively upon it. While the railroad has materially lessened the need of driving pigs overland to market there are yet many feeders of pigs in this country who find it necessary to drive five, ten or more miles to deliver their herds to the shipping yards or markets. In these cases plenty of constitution is also necessary. It is no evidence of vigor that in a drive across country pigs should keep dropping by the wayside exhausted and unable to continue along in the herd, requiring delay and later attention.

This leads me to another phase of this subject to which attention should be directed. As is well known, when in a natural position the pig stands on a foot which is divided into two toes. Between his toes and his ankle, which is known as the pastern joint, is a short space termed the pastern. Associated with the leg and back of the pastern joint are two small, abortive toes ,commonly termed the "dew claws." When the pig is standing naturally he should be well up on his toes, the pastern should be strong and quite erect and only slightly oblique, and the dew claws well off the ground. When the latter are touching the ground, under fair conditions of surface, it simply indicates that the pig has not the strength of leg that he should have. It denotes a weakness of the muscles and ligaments of the leg .and shows a broken-down condition quite inconsistent with the aims of the best breeders of the day. To illustrate how breeders view this matter examine the pictures used in advertising pigs and see how many of them show anything but straight feet, up on the toes, and the dew claws well off the ground. A too stiff-toed pig is undesirable, but such are rather uncommon. The broken-down pastern, however, is much more undesirable and is a clear indication of leg weakness. Further, the heavier the type of pig the more desirable the strong foot to bear up the weight of flesh. If one wishes to drive pigs to market the legs should be well made and strong, capable of bearing the journey easily. Not only is a strong leg desirable from the standpoint of utiity, but if we consider beauty in the beast we get it in much greater degree in the pig standing up well on his feet instead of on broken-down pasterns.

Some pigs and some breeds are greater sinners in this respect than are others. All breeds are affected more or less with poor feet, but the plumper, quick-fattening, heaviest ones most. Although comparisons are odious, no breed stands on poorer feet and needs feet improvement in this respect to a greater degree than does the Chester White. A personal investigation among pigs of this breed in search of breeding stock with years of experience in breeding them and comparing with other breeds, convinces me of the truthfulness of this statement. Further, not to offer this as my own opinion entirely, more than one breeder of Chester Whites in by presence have agreed to this statement. Still further, in the year 1900 or thereabouts one of the most famous breeders of Chester Whites then living, a man who has done more to advance the interests of the breed than any one else of whom I know, in correspondence with me agreed that the Chester White was the worst of our breeds in this particular respect. In view of this fact Chester White breeders should make unusual efforts to remedy the defect referred to. That it may be done there is no doubt. Careful selection must be practiced and herd boars of very superior bone and form, that stand up well on the feet, should be used. Further, brood sows of the right sort as near as possible should make up the herd. This difficulty of broken-down pasterns is usually associated with animals that have been forced very rapidly while young, and so have acquired too great a weight for the feet to support properly; but the fact sill remains that there is inherited weakness more often than not in the pig in this respect. Another quality which the modern pig lacks more than he should is a good strong bone. The food plays an important part in giving strength to bone, but unquestionably the pig of today has inherited too great a share of this weakness. No other farm animal, in proportion to its size, has to support so great a weight as does the pig, consequently a strong leg bone and good foot carriage is a necessity. To secure it the breeder must do two things: (1) Breed with strong-boned animals. (2) Feed more muscle and bone-making material.

No plea is here being made for coarseness, but for quality and strength. Among well-bred herds of today coarseness is exceptional, while too much refinement is far too common. If one questions this let him go into a herd of pure-bred pigs of any of the more prominent breeds and note the way they stand up on their feet, how small the shank bones are and how poorly they support themselves.

Food will help materially in this matter. Prof. Henry, at the Wisconsin Station, in studying the effect of food and mineral matter on bone conducted interesting experiments on three lots of pigs. One lot was fed corn meal only, another was given ashes with the corn in separate box, and another bone meal with the corn. Without discussing the influence on general growth it will serve the purpose to refer to the influence on the strength of bone proper. The thigh bones were tested in a machine in the mechanical laboratory to measure their breaking strength. As a result of two feeding trials of 84 and 112 days respectively it was shown that to break the thigh bone, where corn meal only was fed it required 301 ℔s. pressure, where ashes were fed 581 ℔s., and with bone meal 680 ℔s. In other words, by feeding bone meal the strength of bone of the hog was more than doubled. Not only that, but there was about 50 per cent. more ash in the bones of the hogs receiving bone meal or hardwood ashes than in the bones of those not so fed.

In another direction, a criticism may be made of our fatter type of pig, which is that, at least with some breeds, many individuals seem to fatten rapidly up to a certain period and then stop growing, excepting very slowly. More than one feeder has found that his pigs would fatten from three to five or six months, and then seem to reach the limit of profitable growth. The pigs would remain attractively fat, but the progress of expansion seemed sadly curtailed. This is no imaginary condition. Such inability to continue growth has its unfortunate phase in a slow, dragging development with breeding animals.

This leads me to say that our method of treatment must be different if we are to maintain to high standards some of our present breeds. A pig should keep growing and expanding in a noticeable, desirable and profitable manner for at least 18 months. At one year of age he should weigh at least 375 pounds. We should be able to get a weight of 225 pounds at six months of age, and then if it is not desired to sell he should keep on growing. The question may be seriously raised, if the mature brood sow of today is not under-sized and too smal in frame. Those who remember the Poland-China of 20 years ago cannot but note how much smaller matured females of today are in the comparison. And if the figures were available it is my opinion that it would be shown that the litters of today are much smaller also.

In the desire for excessive fat so characteristic of the American feeder has come much more of injury to our breeds than many realize. It has resulted in producing the fattiest hogs on earth, and we have gone so far that consumers object to the large proportions of external fat on the carcass. Lard, once almost the only grease available for standard use in cooking, has been very much replaced by the use of vegetable oils. The demand for lard is not as relatively great as it once was. In the packing houses one will see workmen slicing off long strips of external fat from heavily-fatted pigs, in order to place the meat in the most saleable condition for the consumer. Our American pork also as a rule is so fat that we are unable to get a foothold in the European markets, exsepting for hams and a limited amount of fairly lean meat. The mass of people in Europe demand a class of bacon and pork which is reasonably supplied with meat.

It is not my purpose here to advocate the use of the so-called bacon pig, but will it not be essential for our future success in the swine industry to secure in our American breeds some of the good qualities of this bacon pig? The bacon pig is prolific. This quality is desirable in any breed. The bacon pig is as a rule active and vigorous. These are desired in any breed. The bacon pig makes high-class bacon. This is valued in any breed. The bacon pig has strong bone and stands up well on his feet. These qualities are valued in any breed.

An American breeder of swine is favored with his share of human intelligence, and he has the ability to improve the pig within all reasonable bounds. It will not be necessary for him to introduce the bacon pig as a panacea for his ills, but by judicious selection, careful breeding and sensible feeding he will be able to so develop our present breeds as to meet with all reasonable demands. In this connection too great stress cannot be laid on intelligent selection and breeding. When this is properly followed up the desired results will be secured. In the meantime we must not mislead ourselves in the belief that what we have is all right. No true breeder ever reaches his own ideals, and he who secures the greatest success can only attain it through the most persistent effort, making use of every legitimate means at his command.

### Discussion.

Mr. Lantz: I would like to ask whether Professor Plumb considers our winter wheat bran a good feeding ration for growing pigs?

Professor Plumb: Personally I would not advocate the use of bran for pigs, for the reason that anything of a chaffy character like bran is undesirable for growing pigs, and is better suited for the breeding sows. I should prefer to feed middlings or shorts rather than bran which has almost the identical feeding value. It is so much smaller that it will not irritate the digestive tract of the pig and will not cause the trouble that bran will.

A Member: My experience with hogs has come largely from the market. I have been advocating that we shall breed what the market demands. The market demands a fat pig quite short legged, with the lowest possible total waste, and the American people have been breeding for just what the market demands. The question for the breeders today is, how to keep out the waste and maintain a high percentage of meat and yet have the fecundity.

Professor Plumb: I am not presenting an argument for bacon hogs. There are two types of hogs that belong to the fat class in the United States. I am talking to the market man as much as to the breeder. My paper has also a direct application to the feeder. The pigs of the Poland China type in particular and also the Chester White have broad backs and quite long sides. An inverted pear shape is a rough illustration. You take the Berkshire which stands half way between the present exaggerated type of Poland China and the bacon hog and it has a back which is not extremely broad, and has a deeper straight side and a straighter line on the back. I would not hesitate to say, knowing something of the Chicago market, that a carload of pigs of this middle type which is neither extremely fat nor of the high bacon type will receive just as high price as in any market. One of the Swifts of Chicago stated that if a sufficient quantity of these pigs could be shipped into Chicago at one time they would receive a higher price. I have been on vessels which carried dressed meats and live stock and have seen any quantity of light pigs, 50, 75, and 100 ℔s. dressed. I have been in the packing houses and have seen them getting out a certain lean type of pig which was being killed and run off for export. I am not arguing in behalf of the bacon pig, but we may be going to the other extreme—making pigs too fat in order to make a little money. I think the breeders' associations to today have a particular duty which as a general rule they do not see and I thought this a good place to introduce the subject.

A Member: Has Prof. Plumb ever fed tankage or dried blood?

Professor Plumb: I have fed a ration to a brood sow of a mixture of half cornmeal and half middlings and have also used in connection with it within the last few years a small quantity of tankage. Another thing which is uesd is dried blood or a certain class of meat which is a refuse from packing houses. In cities like Pittsburg and some of the larger cities East, I am sure the slaughter houses make a certain class of marteial which has been cooked, for feeding the brood animals. The blood should be heated up to a certain temperature, otherwise there is a possibility of causing disease. Tankage is of value because it has been through the cooking process and there is no liability to this trouble.

I have bred the Yorkshire pigs for two or three years and have crossed with the Poland China and have never seen a better class of pork than was obtained. I have also crossed a Yorkshire on a Berkshire with somewhat the same result.

Mr. Henry Palmer: I didn't think there was anything for a Tamworth man to say when the Professor got through. I have been breeding the Tamworths for four years and am well satisfied with the result. I think that if we give them the corn diet we will get all the fat required. I had one litter of pigs, the average weight of which when 205 days old was 214 lbs. dressed. The heaviest weighed 236 lbs. These were not forced with an idea of making heavy weights. I don't claim that no other breed would make these figures but I do not think that any other breed would make a more saleable hog. As for the size of the litter, that is usually all right. We generally have more than we can raise. I had five that dropped their pigs this fall averaging thirteen and a fraction; two, averaging fifteen; others averaging sixteen, nine and eleven.

Mr. Norton: I have not experimented with the Tamworths in crossing with the Poland China but have with the Berkshire and can produce as fine a pig with this cross as can be found. Last fall, I had a litter averaging 160 lbs. the day they were five months old and I never fed them over two quarts of cornmeal and skim milk. I don't like the Tamworth except as a brood sow. One which I had has produced an average of 10 pigs to a litter, and now after three years as a brood sow is a success. Also as a runner she is a success.

Mr. Smith: Would you advise using any of the prepared foods for hogs?

Professor Plumb: I would not recommend the use of any of the condimental foods (1) because they are high in price and out of proportion to their true value; (2) because in some cases I prefer giving medicine to my stock rather than to give something I do not know anything about. of condimental food for pigs. I would ment station they would send you a bulletin on the condimental food for stock, detailing the results of the use of condemental food for pogs. I would also state in this connection that one or two other examinations have been published. I know of no results in the use of thesefoods that have been as good as in those obtained in the use of non-condimental foods.

Professor Plumb: Just one thing more; we Americans are the queerest people in the world; we want the Philippines, Cuba and other territory and we say that the world is our market, but with the American hog we are peculiar; we say we don't care anything about our sale of it. In 1900 I made a trip to the other side of the water, and spent some time in Denmark, where an immense number of bacon hogs are fed for the British market. I spent also some time among the butchers of Smithfield. It is an interesting thing that in the larger cities across the water you see produce coming in from all parts of the globe. I was told by one of the butchers in the Smithfield market that we Americans are terribly independent people; that we say, if we cannot sell our pork to one party, we can to another. The Canadians ask what the market demands, and supplies it. Little Denmark is today controlling the British market for pork and for bacon and we here in the United States with our immense droves of hogs have to restrict ourselves almost to our own territory.

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# Fundamental Principles of Breeding.

## By Watkin G. Powell,

of Shadeland, Pa.

The programme for this evening, I find, is quite different than I had supposed. I had expected from the published announcement that somebody was to precede me with a written address and I simply to lead in the discussion to follow. But I learned only a few hours ago to my great surprise and disappointment that nobody was to precede me. I am not prepared with a set address or as I would like to be. And I will add, not as I would have been, had I known what was expected of me. I relied upon the expected address to suggest the points to be discussed. As it is I will attempt only reference to some of the recognized principles of breeding as

they may occur to me as I proceed.

Allow me to caution you, however, that you must not expect I will advance any new principles of breeding; for there are no new laws of reproduction. The laws of heredity are fixed and immutable, and as old as the immovable and everlasting hills. All that we can now hope is the better understanding of these laws and the better to apply them.

The question of reproduction is a very mysterious one in every consideration. In fact all nature is a mystery. We look about us and observe that the grass grows. Can any of you tell why it grows? We see the trees bud forth and after a season the leaves fall, and this repeated on year after year. By the side of the deciduous tree, nourished by the same soil stands the evergreen, from which the leaves do not fall. Why is this so? Side by side, and under the same conditions, we find the odorless and the fragrant flowers, each seemingly in like degree of perfection. Explain all this if you will.

None of you will say that you do not believe that these things are to simply because you do not understand why they are as they are.

Therefore I would say that we should be careful and not conclude that there are things in the matter of animal reproduction that we will not accept or believe simply because we do not understand them. That would be on par with that of the anti-religionist whose principal argument is that he will not believe because he does not understand; that he cannot reason it out. The same position will apply to nature; and we would be incredulous indeed if we would accept as true only what we can understand.

"Breeding" is more generally considered as applying to animate natrue and in that direction has most attention been given. However, more recently much attention has been paid to the improvement of vegetable and plant life, which is nothing more nor less than breeding.

There is a flourishing association in the West of the breeders of seed corn, and it is claimed that already important results have been accomplished. It is believed that in time—lished. It is believed that in time—a comparatively short time—it will be possible to produce different breeds of corn each differing from the others in disirability for different purposes as fully as we have produced different breeds of our domestic animals; that some of these varieties or breeds of corn will produce a greater amount of fat, others of protein and still others will excel in other respect, just as we have live stock especially suited for various purposes, as the milk breeds for the dairy, the beef breeds for the block, etc.

All this emphasizes most forcibly the influences and effects of intelligent breeding in any line.

But by "The Fundamental Principles of Breeding" as named in our programme for discussion at this time undoubtedly reference is had more especially to their application to the reproduction of our domestic animals. It is not necssary to refer to the vast importance of our domestic animal industry. All admit that.

The exact origin of each kind of our domestic animals, while of great interest, is not so important to us now as their improvement, however well we would like to know their precise origin.

There is no question as to the great antiquity of their ancestry. No doubt they existed long before the human family. The horse, cattle, the fowls of the air and the fishes of the sea, we find referred to in the early history of the world. After their creation man was made.

We have just heard one of our domestic animals (the hog) most interestingly and learnedly discussed. One thing, however, the Professor did not tell us,—why it is that hogs all turn their tails to one side, and most of them to the same side. Now why is it? I do not pretend to say why it is, but there is a cause. Possibly it came originally from accident, and we have been breeding on for ages with the tail turned to one side until it has become a fixed characterstic. But if we cared to do so we could breed out this tendency.

We find the same peculiarity in dogs, most curs and mongrels turning their tails to one side and generally to the same side. But by careful breeding this tendency has been so far eliminated until now in most kennels of the full-blood dog of most breeds the turning of the tail to one side is considered a disqualification.

We have the horse,—the great

ponderous draft, and the little Shetland pony, probably from the same origin, results of breeding. We have the trotter and the pacer produced from similar or the same crosses, but doubtless from ancestors, perhaps however quite remote, of different accidental, educated or natural tendencies.

So, too, we have the different breeds of cattle, probably from the same origin, although just what our cattle descended from is a mooted question. Some advocate that they came from a wild species similar to the buffalo, while others contend that there are anatomical objections to this theory and that they sprung from a wild race more nearly like what they are at present. There are even yet or were comparatively recently a few specimens of a wild breed of cattle in some of the preserves in the old countries that possibly are of older origin than our domestic cattle, and from a similar source may have descended ours of today.

But how are we to profit by the lessons, and what are we to learn from the observations and experiences of the past? What applications can we make of their teachings as relate to the ever interesting problem of reproduction? It is breeding that has produced the marked difference in animals of the various classes.

It is an old and trite saying that "like produces like." Considered in the light in which it is so often misapplied it is not true. We take for instance two animals that are similar in conformation and breed them together and perhaps get something unlike either, because the ancestors of the animals were unlike. But the maxim "like produces like" considered in its broadest sense as applied to breeding is in a great measure true. Like produces like when we have uniform characteristics in all of the ancestry back as far as their influence may extend; but even then we must take into consideration the hidden influences of surroundings, circumstances and conditions.

We have all observed the marked similarity among the birds and wild animals of the different kinds, the result undoubtedly of similarity in the ancestry, and also in a measure owing to similarity in conditions. That same principle carried out with our domestic animals would bring the same results. To produce uniformity we must have the samec haracteristics in the animals themselves, as also the same tendencies coming down from both sides.

Dr. Elwood Harvey gives the following apt illustration. While on one of his visits to a patient he noticed on a farm a drake with a single feather of the color of a breed of ducks formerly in that section of the country, but then supposed to be entirely extinct. He bought the drake and a duck from the same brood and bred them together and then their descendants with the result that he actually reproduced, or perhaps I should say restored, the breed with all its original characteristics. It is an interesting and forcible illustration of the effects of inbreeding. We find with people too, manifestations of like influences and tendencies. It is not uncommon to see a family dropping off one after another even in early life from pulmonary or other diseases and yet the father and mother both living on to good old ages. Such cases are frequent and undoubtedly owing to the same tendency in both parents. Tendencies too are intensified by inbred blood relationship.

The same rules apply also to physical traits. A good illustration of this is found in the oarsman Hanlon. His father was light-house keeper and a dexterous oarsman. The mother was accustomed to row out to the light-house with the father's meals. She, too, became so expert at the oar as almost to defy wind and weather. Finally to them a son was born. He grew up amid these surroundings and in this practice and later became the champion oarsman of the world. This was undoubtedly to a great extent the result of inherited instinct and skill the habits and practices by both the father and mother.

Acquired and educated characteristics too are liable to be transmitted though not to the extent as inherited tendencies. Not only should we have in breeding uniform characteristics but uniform temperaments. We should also breed for brain and nerve force especially in animals intended for use in our exercise and pleasures. A dung-hill so called may out-run the Thorough-bred for a short distance. but lacking in nerve force he soon tires and "quits" while the Thorough-bred will run on for miles. Animals with brain and nerve force have too, not only greater strength and endurance but also more courage than common cold-blooded animals, consequently are safer in emergencies. Many of the so-called "safe family horses" lack nerve and may easily and unexpectedly lose control of themselves while those of better breeding and more courage might not move under the same circumstances. So in breeding we should not alone consider physical formation but also brain disposition and intelligence.

Bear in mind that faults and defects, if characteristic, are quite as apt to be reproduced as desirable traits or tendencies and are intensified in the same manner, so especially avoid inbred weaknesses. Remember that a chain is no stronger than its weakest link. So with an animal. If there is a weak point that is the point by whoch to judge of its merit.

In correcting defects do not attempt to do so too violently. One animal may have a defect in the opposite direction; a horse, for instance, may be too high in the back, or roach-backed as it is called, while another is low or sway-backed. It is not well to undertake to correct either fault by breeding these together. It is safer and surer of favorable results to cross either animal with one correct in form. Opposite winds may produce a hailstorm but seldom to any good purpose.

In breeding, too, it is essential to consider whether the defects it is desired to remedy are in the sire or in the dam. Do not overlook the fact that, as a rule, the sire to a greater extent influences the extremities of the offspring, while the dam more generally controls, to a greater degree, the bodily formation. We find a marked illustration of this theory in the mule, produced by crossing the jack upon the common horse, with the result that we get an animal with the head, ears, limbs, feet, tail and even voice those of the sire, but with the body in size more after that of the dam. Crossed the other way we got what is called the hinny, a pony-sized animal with the head, ears, limbs, feet, tail and even the voice all like those of the horse, but the body, in this case, as in the other, more nearly resembling that of the dam. Likewise the sire more strongly influences the action. Far better results are attained from trotting sires and running dams than by crossing the other way.

The same principle holds true in the breeding of cattle. Breeders of polled cattle have found that their success has been far greater by the use of polled sires and horned dams than the other way. And as singular as it may seem, results have proven that even in the production of milk, it is more important that the sire be of a deep milking strain than even for the dam.

So always keep in mind these recognized and established principles for the correction of faults, for successful breeding consists no less in eliminating defects than in reproducing desirable qualities.

Should you ask me to suggest what to breed, as well as how to breed, although this is not a part of my subject, the whole question could be covered by the simple answer, "Breed what you want." And the chances are that if you do it intelligently you will produce it. First consider your tastes, because you will take more interest and your success more probable, in what you like. Consider too the conditions your means, your surroundings, your advantages and disadvantages. Consider also your object in breeding; if mainly for your own use, what you propose to do with the surplus; or if for market what are your facilities for marketing.

Then when you have determined what to produce, select animals nearest to your ideas and breed accordingly. But do not under any circumstances, breed atr andom. Any breed is preferable to no breed. Shun grades and mongrels, especially as sires, from ancestry dissimilar in form, size, characteristics and tendencies; not only for satisfactory results, but also for safety. It is from just such sires as a rule spring our deformities, enormities and monstrosities; seldom from sires of uniform ancestors.

Avoid too, sires of extreme size. Advertisements are common of horses weighing so many tons. Do not be carried away by any thing of the kind, even though you may desire to breed as much weight as you can in a well proportioned animal. How much of this claimed extreme weight is made up of worthless, or worse than worthless, fat? I have known the same horse of matured age to vary in weight more than seven hundred pounds, the difference being produced entirely by flesh and fat, and he was a far better horse at three to five hundred pounds below the outside weight than at that extreme. Always consider whether the heavy weight is the reasonable full weight of the breed. If it is not let the animal severely alone as a sire. You will ordinarily get far better results to breed to a sixteen hundred pound horse than to one weighing a ton if the former is up to the reasonable full-size of the breed.

Do not run off after some craze or fad. Either is generally without established merit and usually is short-lived, and may prove of irreparable damage by upsetting all that you may have already accomplished.

In nothing is careful consideration, close observation and the exercise of good practical common-sense more necessary than in successful breeding; I am sorry to say as a rule, in nothing are these more lacking than in breeding as too generally practiced.

But until we get our domestic animals up to a greater degree of uniformity we must, at best, be prepared to expect some disappointments. However, there are fewer now than formerly and they are becoming fewer and fewer as we progress.

Hidden influences, too, such as surroundings, conditions, both mental and physical, as also accidents, &c., do and will affect results to a greater or less extent, as is evidenced by the fact that twins as a rule closely resemble each other, while other full brothers or sisters to them of different ages are distinctly unlike. But the greater the similarity in the characteristics and tendencies in the ancestry the greater resemblance in the offspring may reasonably be exepcted not only in appearance but also in temperament, disposition, &c.

Notwithstanding the occasional failures and disappointments that do and will come even after the greatest pains and strictest observance of recognized principles, it is most gratifying to know that we are making vast advancement in the improvement of our domestic animals; that through careful and considerate breeding the failures are fast becoming the exceptions, not the rule; that the hopes of yesterday are becoming the expectations of today; and let us believe that, as the years go by our disappointments will be come less and less frequent until, let us hope, that the anticipations of the present will become the reasonable realizations of the future.

In our breeding let us carefully select our animals as nearly to our liking as we can, with as uniform characteristics and tendencies as possible, never losing sight of the one essential, indispensable rule;—the one great "Fundamental Principle" that nature courts uniformities but shuns antagonisms, and our success is assured.

### Discussion.

A Member: I should like to ask why breeders of beef cattle pay more attention to the remote female ancestor than to the immediate male ancestor, and why dairymen pay more attention to the bulls than to the females in the pedigree.

Mr. Powell: It is a generally accepted theory among breeders that the male influences the extremities and also the production of milk more than the female, and that the female influences bodily formation and meat production. I think this theory is really founded upon results.

Mr. Bayard: I have been surprised at the high prices paid for common beef bulls because they were of some fashionable family. I have seen much better ones sold in the same ring for less money. It seems to me we are making too much difference in price in cases of these remote ancestors.

Professor Plumb: A part of my business is studying the breeding question. That is one of the things I have to teach in the Ohio university. I think it is a wrong conception to hold that the perfection of the beef animal depends upon the female, and that of the dairy animal upon the male. You will flind that these qualities depend largely upon the family. It is a difficult thing to establish upon absolute facts that certain qualities can be secured any better from the male than from the female.

Mr. Bayard: I agree with Professor Plumb, but at the same time, the condition exists. I have one heifer of a fashionable family named for a cow which is seven generations back in the maternal pedigree. I have another sired by one of the greatest bulls of the breed, but not fashionable family, and I can get twice as much for the first as for the last, though she is not as good individually. I claim that too much attention is paid to remote female ancestors, and that we are going crazy over the family business.

Professor Plumb: As an illustration that the pedigree craze does not always indicate good judgment on the part of the buyer. I have known of cows bought for fancy prices on this basis which never produced calves.

Mr. Powell: We have to be governed by the people with whom we have to deal. At the same time I would say, don't overlook individual merit. It is the same with the trotting horse; one animal will sell for a thousand dollars with a certain record. Another animal with the same record, but of different breeding will sell for three or four thousand dollars. We have therefore to take into consideration somewhat the kind we believe in, and must have reason for our belief. It is true, however, that our buyers and our breeders go pedigree crazy sometimes. You will find the same thing applies to the question of cattle. The people will have a fad, and you connot breed it out of them any more than you can breed it out of the animal.

The President: We know that some of the most wonderful animals in horses and cattle have been produced by inbreeding. but it is a question, I think, whether the ordinary farmer does not ruin more cattle by inbreeding than by out-crossing. I think with breeders it is different; they study the crosses; but, the ordinary farmer often makes a great mistake.

Mr. John I. Carter: We "ordinary farmers" make mistakes in breeding and in almost everything else we do, you know.

The President: There is no necessity for it.

Mr. Lantz: When you talk about pedigree you touch me at a tender spot. We are entering again in this discussion somewhat into the deep waters of the science of breeding, and I want to put myself again on record as a strong advocate the firm deliever in pedigree in the advancement, development and improvement of our breeds of live stock. Some years ago our farmers in Pennsylvania began, and are making a mistake today, in continually crossing breeds. After they got a number of them started they began crossing types and families; families of the same breeding but of opposite characteristics. I do not believe we can lay too much stress upon pedigree when pedigree and the different stock represented are thoroughly understood. I do not believe we should bred opposite types or characteristic or families that are too much opposed in type and form. If we do not make a study of pedigree, I would like to ask by what are we to be guided that we may select the desired families and types of a certain breed not too opposite to produce the desired uniformity?

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Adjourned to Thursday, Dec. 11th at 1:30 p. m.

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Second Day. Afternoon Session.

The meeting was called to order at 1.30 by the President, the Hon. W. C. Norton.

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# Better Practice in Breeding Our Farm Animals.

## By Prof. C. S. Plumb,

of Ohio State University.

A few weeks ago it was my pleasure to visit a farm where 300 head of steers grazed on rich pastures. There were many fine specimens among them, but it would have been difficult to have found even one that could have been selected out and fed with a knowledge that it would prove a winner in a show ring against picked individuals of his own kind and class. There were little defects here and there among this bunch of really beautiful steers, that scored each individual below perfection. It might be a droopy back, or a slackness behind the shoulder, or not the best sort of a rump, or some other fault, but there was a fault.

Our last census, for June 1900, reports almost 69 million head of cattle in the United States. How many of these, think you, would do to go in the show ring? Or going to the other extreme, how many of these, think you, ought never to have seen the light of day?

One familiar with our farm animals, who has carefully studied animal form and its relation to production, cannot but feel and realize that an unfortunately large per cent. of the animals on our farms are inferior in character and quality, and in far too many instances do not pay for their keep.

If one will but look with observing eyes, he will note two facts. First, that of the farm animals with which he comes in contact, but few are creditable or even good specimens of the breeder's art. Second, that the live stock and agricultural press publishes many contributions on feeding, and but few on breeding. There are men today in our experiment stations who have become famous for their investigations in feeding animals but there is not one name among them yet, where fame has been secured as a result of breeding experiments.

You will readily understand why this is so. How it is apparently easy to feed, yet what time and patience and study are necessary to breed aright. Yet, I address you today, on the assumption that a knowledge and an application of the principles of breeding are as important and fundamental to success in producing farm animals, as is the necessity for a good foundation under the structure the architect is planning. Of the two things, breeding and feeding, the former is the more important, for it acts as the sub-structure upon which successful feeding rests. To the great breeders of the past are the breeders and feeders of today indebted for all the best that exists in our present flocks and herds.

What would our live stock of today signify, had not Bakewell, Collings, Bates, Booth, Cruickshank, Ellman and Webb glorified the past with their achievements! Think for a moment of Bakewell, and his labors of over a century ago! Reared among a class of animals that did not impress him as either beautiful or profitable, he began a study of animal life and force that has had no parallel in our live stock history. Careful selection, mating and breeding, were pursued with persistency, covering many years of time. Bakewell had his ideals. He sought individuals that approached those ideals as nearly as possible. He had learned that like produces like. His methods were far reaching. He studied not only the living forms, but history tells us that he made studies of the slaughtered animals, and preserved in pickle parts of the carcasses for comparison in future years. Bakewell began his work a subject of ridicule. Yet he lived to see the day when mankind paid just tribute to his greatness as a breeder. The English cart horse, Longhorn cattle and Leicester sheep were improved and distributed widely by Bakewell. He introduced the system of letting out males for breeding purposes, and it is stated that his income from breeding males in 1789 which he let out to service, amounted to $30,000, for the season. Bakewell was a remarkable man. He more nearly than anyone else is the father of our modern stock husbandry. No such study of the influence of breeding had been attempted prior to his time, so far as history teaches us. Others have followed Bakewell's lead, so that today, the influence and inspiration of these master breeders is beyond calculation. In writing of Jonas Webb, Elihu Burritt expresses well the significance of the work of such a breeder as he.

"But what higher honor can attach to human science or industry than that of taking such a visible and effect that of taking such a visible In sending out into the world successive generations of animal life, bearing each, through future ages and distant countries, the shaping impress of human fingers, long since gone back to the dust; features, forms, lines, cures, qualities and characteristics which those fingers, working as it were, on the right wrist of Divine Providence, gave to the sheep and cattle upon a thousand hills in both hemispheres? There are flocks and herds now grazing upon the boundless prairies of America,

the vast plains of Australia, the steppes of Russia, as well as on the smaller and greener pastures of England, France and Germany, that bear these finger marks of Jonas Webb, as mindless but everlasting memories to his worth. If the owners of these 'well creater things' value the joy and profit which they thus derive from his long and laborious years of devotion to their interests, let them see that these finger prints of his be not obliterated by their neglect, but be perpetuated forever, both for their own good and for an ever living memorial to his name."

In the results of the work of the breeders during the past century, there is much that is not understood, but there is also much that is understood. The law that "like produces like," has a significance and an importance that only the host of stupid could misunderstand. This may be fitly termed the one great law of breeding, through the application of which has resulted much of the best in our stock of today. Our knowledge of breeding is the result of constant observation, and the gathering together of facts from this breeding, the use of which has taught us how to the more intelligently mate animals. Today the wise breeder seeks to maintain animals in his herd, of uniform, superior qualities. A blocky, low down, broad backed, deep bodied, thick fleshed bull, mated to cows of this same sort produces offspring as a rule that resemble the parents, or are perhaps something of an improvement on them. This great law is well illustrated in many ways about us. The peculiar and uniform color markings of the different breeds, the distinctive conformation or shape of certain classes of stock, and the temperment of others, all reproduce with great uniformity.

There is one interesting quality which comes within the action of this law, and that is what is known as prepotency. Certain animals have such superior strength of character that they reproduce in their offspring much of the same character seen in themselves. This is best seen in cases of males, where the offspring resembles the sire in a pronounced manner, and is usually due to the fact that he is somewhat better bred than the stock he is mated to. Many striking examples of this occur among great sires. The Hereford bull "Lord Wilton" was very much given to impressing his special character to his offspring. A few years ago when on a visit to Lexington, Ky., the stallion "Bermuda" was fetched out for my examination, and along with him were also brought four of his sons and grandsons. In conformation, style and color, the descendants of the old horse all bore him a striking resemblance, and testified to his great prepotency.

But this great quality of prepotency is not limited to mere external things. It is seen in the swift speed of the race horse, in the brimming milk pail and pounds of butter, and in the thick loin of beef. From the loins of old Rysdyk's Hambletonian (10) has sprung a lineage of speed that has astonished the world for his children and grandchildren and great grandchildren have performed phenomenal feats upon the race course. The fastest trotters the world has known trace their pedigrees back to that of Hambletonian (10). The blood of the Holstein bull "Jacob" traces down through generations of great milkers, while it is claimed that over 90 daughters of the Jersey bull "Exile of St. Lambert" have records of 14 pounds or more of butter in seven days. And if we turn to flesh production, we find that through the blood of Mr. Cruickshank's "Champion of England" come some of the greatest Shorthorns of the last quarter of a century. These are simply illustrations to show that blood will tell, that individual merit and prepotency are qualities that continue paying a rich reward down through the generations.

And so I wish to make a plea that our stockmen study the subject of breeding with more earnestness and make it play an important part in their business. This is not an appeal to breeders of pure bred stock alone, but to all persons who find it a part of their business to breed horses, cattle, sheep and swine.

The question may be asked, is this a business proposition, and is there money in it. This I will endeavor to demonstrate in a furthe discussion of this subject.

What I wish to impress upon you right here are a few facts bearing upon the reproduction of animals. I have already stated that there is a well established law that "like produces like." It is also true that if two animals are mated, that are very much alike in character, the offspring will more or less resemble each parent, but if one parent is inferior and the other superior and prepotent, that the offspring will resemble the more prepotent of the two. While the males stamp themselves most on the progeny, because they are generally selected with more care than are the females, if an inferior male is mated with a superior female, the offspring will tend to resemble the dam. This is well illustrated in the case of Berry, who had for some years in his possession a breed of improved red pigs. His sows of this breed crossed with common boars, almost invariably produced litters of pigs of this reddish or sandy color.

As a rule it is injurious to breed immature stock, and the best returns are not expected from weak or very old animals. Both observation and experience have convinced me that the use of a ram lamb for example, as sire in a flock, results in lambs lacking character, and of uncertain quality, while the use of a matured ram would have given satisfactory returns.

There is a general tendency, in the anxiety to secure results from breeding herds, to breed the females at too early an age, which too often injures the vitality and growth, and promotes reduced size and quality. Animals should not be required to take on themselves the burdens of motherhood, until they have acquired fair maturity and development. The man who breeds his ewes to first lamb as long yearlings, to have his beef cows first drop calves at 30 months old, or his dairy cows at 24 or 26 months, or his sows to first farrow at 12 or 14 months of age is on safer ground in building up his herd, than the man that will not wait for this maturity. In a measure ,there is also objection in using very old or weak animals for breeding. Strength of character from such cannot be expected to equal that from animals in the prime of age and condition.

The thoughtful breeder must consider carefully the inheritance of his stock. Animals of old, well established breeds, reproduce themselves with more uniformity, and with less trouble to the breeder than do the breeds of more recent development. The Polled Durham of today must not be expected to reproduce polled heads with the uniform regularity of an old breed like the Aberdeen Angus. This leads up to the point where it may happen that horns appear in the offspring from polled sire and dam. This peculiar quality or the occurence of characters which existed no nearer than some grandparent or even still further back in the ancestry, is called "atavism" or as the breeder sometimes expresses it, "throwing back." The scurs or horns which appear in the calf, have cropped out from some generation beyond the immediate parents. And this cropping out shows that the breed yet lacks stability of character. A good example of this same quality of avatism has come within my experience during the past few years, in breeding Buff Leghorn poultry. This is a recent breed and even though one uses Leghorns of good buff color down to the skin, white feathers or brownish black feathers will occur in the chicks hatched from this mating. But by breeding good typical buffs, with no off colored feathers, each generation will prove an improvement on its parent stock in this respect. This quality of atavism has long been recognized, and the careful breeder will give heed to its warning. The man who deals in pure bred polled cattle cannot afford to use in his herd, breeding stock that have thrown horns, if he is working to intensify the polled habit.

Largely as a result of the studies of Darwin and the modern scientists, it has been shown that the various parts of the animal anatomy are more or less related to each other, and that the excessive development of one part is usually at the expense of another part or organ. Excessive milk production is at the expense of flesh production. The food of the dairy cow is converted into milk rather than into flesh and fat. The general purpose cow need not be expected to be either a large milker or a quick flesh producer, while in general experience, the thick fleshed, meaty type of beef animal produces too often not enough milk for its own progeny. The two minute trotter carries just as little flesh as health and vigor will permit, while his every development is in the direction to produce speed, as shown in the lithe, muscular body, and the clean cut, fine bone and limbs. The contrast between the fleshy form of

the heavy draft and of the light weight of the trotter is very striking and shows to good advantage how one development, that of speed, is at the expense of another development, that of weight and flesh. Excessive wool production, as seen in the Merino sheep, seems to be at the expense of flesh production, although the wool of any breed, through careful selection may be improved in length and fineness of staple. These facts simply teach us, that if we are wise we shall find it necessary as a rule to develop special qualities of animals, to meet special needs, rather than all needs. The general purpose cow may be a profitable animal for you to keep, but you need not expect from her the intense beef habit, nor that of milk production, though she may make a very creditable showing.

Another characteristic that some breeders should give more attention to is that of fecundity, or the ability of an animal to reproduce its kind. In the breeding herd the value of an animal largely lies in its worth as a breeder. The owner of a sow that farrows 12 pigs, has much more cause for congratulation than the man who owns the sow that farrows three or four in a litter. The habit of being prolific seems more characteristic of some breeds and individuals than of others. Dorset sheep have for a century been famous for the number of lambs they drop in a year, often lambing twice, and this is recognized as a breed characteristic. The fatter, lardier types of pigs usually produce small litters and the leaner types large ones. Still, some of the fat breeds produce somewhat larger litters as a rule than do the other fat breeds. In a study of this subject among breeds of hogs, Dr. Bitting of Indiana Experiment Station, compared 400 litters of Berkshires, 1086 litters of Poland Chinas and 600 litters of Chester Whites. These showed an average of 7.45 Poland China pigs per litter, 8.22 Berkshires and 8.96 Chester White. Dairy cows are perhaps more apt to breed frequently than are beefy ones, and as some families are much more prolific than others, it will pay the breeder to keep track of this characteristic in not only animals of his own breeding, but also in those which he may purchase for breeding purposes. In the London Live Stock Journal of 1892 (Aug. 12) a number of interesting examples were given of cows that had given birth to many calves. The Aberdeen Angus cow, "Mina 3rd," at 18 years of age, had produced 16 calves. John Rogers of Sawnington, England, gives a case of a Red Poll cow dropping 12 calves in 11½ years, she having her first at two years, five months, and dropping twins twice. "The Shorthorn cow 'Lady Oxford Kirklevington,'" writes Evan Baillie, "only just turned 12 years of age, has had 11 calves, all singles, and is two months gone with her 12th. Her dam "Kirklevington 8th' had five daughters in succession and has handed down such a tendency to female produce that her youngest great great granddaughter is the forty-seventh." William Tudge, the famour breeder of Herefords, at Ludlow, England, gives the case of "Belladonna," in his father's herd producing 16 calves in 12 years, twins being dropped four times, while one of her daughters "Bracelet" in his own herd, dropped eight calves in five years, dropping twins three times, once on Jan. 7, 1890, and again on Dec. 31 of the same year. While this characteristic of producing many young may possibly go to an extreme in cases, it is more likely to be a lacking rather than a present quality. In any case it is not desirable that a dam should suckle more offspring than she can care for properly, whether lambs, pigs or calves. It however, is easier to kill off one or more weakly pigs of a good sized litter, than it is to increase the number in the small litter. And it is better to have a sire from such an inheritance, than from the more common sort.

As one travels about the United States, and becomes acquainted with our flocks and herds, he must of necessity, if observing, note the wide difference in the quality of the animals. But few of our breeders have a fixed type, and our herds present a mixture more often than not of widely different blood. Our stock yards show a vast number of inferior animals. Far too many of our breeders try a male of one breed for awhile, and then change to some other breed. They think they are experimenting, but they are not familiar with much that they should know, and as a result their work is not conducted with intelligence. How many breeders, think you, are there in a thousand, who before crossing breeds, or using new blood, investigate and study two most important things, first—the general characteristics and adaptability of the breed to be introduced, and second—the principles involved in cross breeding? Yet, where so much is involved, should not this be done?

One of the interesting features of a trip to England or Scotland, is the live stock to be seen on every hand. What one sees is in great contrast to our American conditions. There the farmer pursues a method that has a fixed character. For many years the English and Scotch have carefully studied the local live stock condition, and this long ago resulted in the development of numerous fixed breeds over there, each seemingly suited to certain localities. While it is true that some of these breeds are more distributed than others, there are other breeds quite restricted in environment. In Ayrshire, Scotland, one sees only Ayrshire cattle, in Galloway the breed of this name occupies all attention. In Herefordshire, England, the Hereford has long held its own as the only kind of cattle kept by the farmers. In Shropshire, the sheep of this name is pre-eminent, while in the Cheviot hills, Cheviot sheep cover the face of the earth. The British farmer has pursued a conservative, systematic, well established policy, and this refers to registered as well as unregistered stock. There are many herds and flocks in Great Britain that that are pure to all intents and purposes, yet unregistered. The animals are kept up to this high standard, simply because the British stockman has been taught well the lesson of the value of blood and uniformity of breeding. Here on the other hand, our American breeders use a free lance, and consequently one can hardly go to any section of the country and find large amounts of high class animals, such as are in demand in the meat or breeding markets. Here and there are pure bred herds and flocks that have a priceless value to our general stock interests, for to these must we turn if we are to give any standing to the character of American breeders and feeders. And so a proper debt of gratitude will never be paid to such men as Dunham, Holloway, the Robbins', Harris, Clark, Van Natta, Sotham, Riley, Barker, Lovejoy, Allen, McKerrow, Davison and a host of other great and true breeders, for the good they have done American live stock interests.

If the stockmen of the United States would but follow out the British policy, in a measure, and would persistently breed one type, even though not absolutely pure, I am sure our live stock interests would be considerably promoted. But to cross dairy breeds with beef breeds, drafters with roadsters or mutton with fine wool breeds, only complicates things.

The practice of cross breeding is, excepting one generation, and that for the butcher, usually unsatisfactory. This policy seems to set free in succeeding generations weaknesses and undesirable qualities, that had apparently laid asleep in the well established breed, qualities that the improvers had in the pure breed fairly suppressed. Undoubtedly the nearest successful approach to crossing lies in the use of very high class males on grades of the same general type. In this way herds are bred up and improved, so that really fine herds are developed by discriminating breeders. At our fat stock shows provisions are made for showing two classes of fat steers, pure bred, and grades or cross breds, and while numerous pure breds, and high grades are shown, it is not often that steers from pure bred parents crossed are shown. Yet high grades and cross breds have won many a ribbon over the pure bred, tho' all such crosses are usually the result of mating animals o fvery harmonious qualities. When such crossing is done, the new blood for one generation seems to give added vigor and strength to the feeder. And so authorities on breeding are very generally agreed, that the value of crossing lies mainly in producing for the butcher. On the Cheviot hills of Scotland, a favorite type of sheep for the butcher has been produced from crossing Border Leicester rams on Cheviot ewes. For a century or more this cross has been conducted with as much uniformity as has been the pure breeding of the sheep on the hills. In fact, in the English and Scotch markets, the visiting stockmen knows at a glance the source of blood in the butcher stock before him. Experimental crossing over there has long since been discontinued excepting in a very small way. As I have already stated, there are circumstances where crossing is justifiable, but this should not be to produce breeding animals. We have enough of a selection of good breeds today to answer all reasonable requirements. To the man who proposes to cross, I suggest to improve and secure what you wish by the process of selection. The man with a dairy herd can in time work wonderful changes in the capacity and character of his animals by constantly selecting towards the end he has in view. He can increase or decrease size, increase milk flow and also improve the quality of his milk. In any case, however, the process of improvement is slow and requires constant, intelligent study. Our improved breeds of today are the result of two great processes, that of crossing and selection. The former practise is now no longer necessary, while the latter so far as our American conditions are concerned, is most essential to our success as breeders. In fact it always must be so.

Another practise, that has been extensively tried in the past, is that of inbreeding, mating near relations as sire and offspring, etc. The history of the greatest breeders the world has ever known, has shown it to be an undersirable practice, resulting in lack of constitution, infertility and weakness. Bakewell, Booth, the Collings, and even Cruickshank in a measure, resorted to it and inbreeding with the hope that it would produce the ideal animals they desired. Yet in every case they found it necessary to introduce fresh blood into their herds in order to save them from ruin. The close inbreedng practiced by Thomas Bates, resulted in placing a stain on the name of Bates cattle, that it has taken generations to overcome, not withstanding Bates was perhaps the most wonderful breeder of the 19th century. We must have fresh blood in our herds, otherwise there will result deterioration, lack of stamnia, size and general quality.

If one wishes to breed within certain family lines, then it is wiser to practice line breeding, keeping as far from inbreeding as possible, and yet using the blood relationship of animals within the same general family. There are St. Lambert Jerseys for example, and if one wishes, he can breed along a line as indicated by this. One, however, cannot be much in error, if he seeks to secure the very best blood of the breed or type, preferably well removed from the stock to which it is to be mated.

In connection with this whole subject of breeding, every stockman should make a study of animal form and its relation to production. What is the most perfect form to be sought for in this or that animal? If one breeds dairy cows, does he understand what to look for in body form, in character and position of hind legs, in type of udder, in size and shape of milk veins and other details which have to do with the development these? If not, then he cannot develop his herd intelligently, until he has learned some of the lessons associated with this stock. If he does, then by application of his knowledge he should develop a valuable and beautiful herd.

I wish to make a special plea in behalf of the use of superior sires. It is in the highest degree unfortunate that so many inferior males are today used on our American flocks and herds. This is a well acknowledged fact, so much so that some years ago the Holstein-Friesian Association of North America paid a bonus for a year or more for all pure bred male calves that were steered. This was an effort made by the Holstein breeders to improve the average character of the sires to be used. Occasionally one sees a contribution in some live stock paper, urging greater discrimination in buying sires, but on the whole the matter receives little attention. Men who breed pure bred stock do not use the knife freely enough among their surplus males, and so many poor individuals really get out for service on herds owned by the less particular ones. One of the most disappointing admissions ever made to me by a famous stockman, came from a man of my acquaintance known the length and breadth of the land as a breeder of swine. Once I remarked to him, "Mr. Blank, do you ever sell any pigs to the butcher that you do not think satisfactory for breeding stock?" to which he replied, "No, I never do!" This man's ability as a breeder was great, but I do feel satisfied that he did produce at least some animals that ought never to have been used for breeding purposes. I consider it a reflection on the greatness of this man as a breeder that he should have made this admission.

If it is important that the breeder should be particular about the class of stock that he breeds and sells, then he should also be very particular about the sort that he purchases. While but few can expect to buy great show animals, one can have a standard below which he should not go in securing additions to the herd. He should seek animals that are strong where his are weak, and should gradually round up his herd into one of uniform high class. The male with strong constitution will be likely to transmit the thick strong chest development desirable in all farm stock, and if his back be true and strong, with well sprung ribs, even offspring from females with backs of weakly character, will be likely to inherit the sire's strnegth where it is wanted. The man who wishes to perpetuate the fine things in animal character, does not look for the inferior, but the superior individual for a breeder. If he wishes speed, then he mates his mares to a stallion rightly descended in speed lines. If he seeks for milk, then he considers the ancestry in the way of milk production. Individual merit should always be the first consideration, but ancestry or pedigree should be a close second. It is true that blood will tell, and that animal that lacks in richness of pedigree, in a large number of cases may be considered of inferior merit. Too much emphasis cannot be laid on this matter, even with the man who breeds grade stock. So long as all the qualities possessed by animals are inherited, and just so long as these are transmitted to future generations to a more or less degree, just so long should breeders take heed to their work and strive to build up rather than down. And so when one visits farmers and sees them using inferior or commonplace breeding males, only a sensation of disappointment and regret can but reasonably expect to follow. Too many men wish to settle the purchasing question by a certain financial standard, rather than that of first finding the individual suited to their needs and then talking cost afterwards. Too many men desire to buy stock at hardly above butchers' prices, and express no willingness to pay a premium to the man who is offering them animals that have been produced at great cost and effort. We all need educating, but such men need it a little more than the others.

One thing it will always be safe to recommend, and that is if at all possible, purchase no stock until you have first personally inspected it. It is an unsafe thing to rely on someone else to select that for you which is to be used to develop and improve your stock. We differ in our judgment, and each man should as much as possible rely on his own rather than on another's judgment in buying stock. Do not buy animals because they are cheap . Buy because you need them and they will do you good. Pay for quality rather than quantity. Get a good thing rather than a poor one, and do not find fault if you get a poor animal when you have paid the price for that kind.

In concluding this subject, I would not in any sense under estimate the importance of the subject of feeds and feeding. You will agree with me that we should feed only those that will yield a suitable reward in profit, yet how are we to secure this reward, unless we first breed the animals to eat the feed? So if we are to breed them, then they should be bred right, or not at all. And if we are to purchase the results of some one else's labor, then we should be wise enough in our own conceit to select feeders that have been bred right. There is no doubt in my own mind, that there are many men this winter who are studying the economy of feeds, who have no idea whether the animals they are feeding are paying for their keep or not. And so while it is agreed that the subject of feed is a very important one, the matter of breeding is the foundation on which successful feeding must rest. This is my reason at this time for making this plea in behalf of better practices in breeding our farm animals.

### Discussion.

A Member: I would like to ask if Professor Plumb has noticed in the breeding of animals any effect of the first pregnency upon the subsequent issue in regard to change of characteristics? I ask this especially in view of a little experience I had some time ago with some Southdowns. I found that there set close upon the skin a very fine wool almost like the Merinos. I looked at the skin itself and it had the Merino type of skin instead of the ordinary hide of the Southdowns. I looked at these animals and looked at the pedigree. There was no question of the pedigree, but at the same time I took one or two others and we looked and came to the conclusion that there had been some influence at work in that flock and that that influence had been brought to bear upon the subsequent pregnancies by the sire or the first impregnation.

Professor Plumb: In other words, want to know if the first sire produces any impression on the female that will be felt, no matter what subsequent sires there may be. About fifteen or twenty years ago the theory was accepted that the first sire would have an influence felt during the succeeding life of the female. A great deal has ben written in support of this theory; notably in the breeding of one animal with a quagga and afterwards with a thoroughbred the the subsequent offspring had the peculiar marking of the quagga. That impression stood for a long time, but within the last few years Professor Ewart of the University of Edinburg has been conducting some of the most celebrated investigations yet brought forth. He took a zebra which was the nearest thing to a quagga and bred it for the first time to a Shetland pony. He also conducted some experiments with the horse, with guinea pigs and with other animals. While the most expert work in this direction has been going on for years it has been impossible to obtain evidence showing that the first impression leaves any subsequent influence.

Mr. Powell: With the ordinary domestic animal I question whether there is any influence whatever. We have very marked illustrations. Alice Carneal, the dam of Lexington, previous to producing Lexington produced a mule. Sweepstakes, the dam of Star Pointer, also had produced a mule. The influence, therefore, in these instances was not very detrimental.

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# Beef Making

## By Prof. Thos. I. Mairs,

of Penn'a State College.

Although it is true that conditions in no two states are exactly alike, nor are the conditions exactly alike in different parts of any one state, yet there is no reason why beef production in Pennsylvania should differ radically from beef production in Illinois or in Missouri. Of course, it is known that there are other products of agriculture which in this State have been found by many of the farmers to be more profitable. This partly on account of the higher price of the land, and partly on account of the proximity to regular and almost unlimited markets. The soil, to be sure, of this State in many parts is greatly different from that of what might be called the beef producing states, yet there is no part of this State, as far as I know, which does not produce in abundance those crops which are necessary for the production of beef. The crops which I have reference to are principally Indian corn, clover and blue grass.

As you know, Indian corn must for a long time yet furnish the basis of our fattening rations in most parts of the country. In the South cotton seed products to a great extent take place of corn in beef production, but the amount of beef fed thus far on cottonseed, meal, hulls, etc., is very small in comparison with that fed on corn.

In recent years, most of the cattle fed for beef in this State have been from the west, yet is it not possible and desirable that many more of these be raised at home? It may be argued that the land of Pennsylvania is too valuable for pasture purposes, and that beef production cannot successfully be carried on without pasture. Nevertheless ,it is well known that in Great Britian, the home of the beef breeds, land is a great deal more valuable than in this State; but there the farmers pay the same attention to their pastures that they do to their other fields. They study the production of their grazing crops as well as the production of the crops which they harvest. Their pastures are regularly fertilized and cultivated and re-seeded and given whatever attention is necessary to promote the largest yield of grass. Too often in this country land is cultivated in grain and other crops until it will not make a profitable yield, and is then turned into pasture. The pasture is the most neglected part of the farm and is supposed to be able to take care of itself. All of the more prominent breeders of pure bred stock in this country make large use of pasture. In many parts of this State there is land going absolutely to waste, which might be profitably used for grazing purposes. There is a large amount of land in the State which is too rough for cultivation, but which will make good pasture. Most of this land was at one time heavily timbered, but the timber has been removed and fires are now allowed to run through it from year to year, so that it cannot be re-forested. It is growing up annually to plants which are of no value whatever.

In times past the centre of the beef producing industry has moved toward the west. The large tracts of public domain formed excellent pasture and were to be had for occupying. At present however, all this is changing and the centre of beef production must sooner or later come eastward. These large tracts are being taken up by actual settlers, and land is becoming too valuable to be allowed to lie idle. The United States Government in behalf of the settlers is tearing down the fences which have been built on the public land by large cattle owners of the plains. Many of the large ranches not on public land are already being divided up into farms and smaller holdings, as the Capital Syndicate or X. I. T. ranch of the Pan Handle, of Texas, and many others, less extensive, have been done. It is becoming more and more expensive every year to produce cattle in the west. Pennsylvania feeders must each year rely still more upon home grown animals for beef making. This being true, it is to their interests to look to that class of animals and those kinds of feed which will produce beef most economically.

In order that the breeder may obtain the best price for his product, it is necessary that he feed animals of the type that is demanded by the market. At present, the market demands an animal with a broad back, and large development of the hind quarters. When an animal is bought, it makes a great deal of difference whether the last few pounds of his weight is composed of sirloin or porter house which will sell from 20 to 22 cents per pound, or composed of soup bones that will sell from 3 to 5 cents per pound. The average farmer often seems to think that a cow is a cow, and that it is a mere accident whether she is a good milker or will produces calves that are good beef animals. It is impossible to produce beef profitably from mongrel stock. It is not that they will not make good gains, nor that they will not make good use of the food consumed. It is because the form is not such as to sell for the best price in the market. Tests which have thus far been made show that the ordinary scrub steer will make a pound of gain on as small an amount of grain as will the average Shorthorn, or Angus, but when each has made this gain, the scrub will sell for one or two cents per pound less than will one of the beef type. The reason for this is that the animal of the beef type has his flesh in those parts from which are taken the higher priced cuts. The fat of the scrub or dairy type of steer is large intestinal, while that of the beef type is more evenly distributed throughout the muscular system. His muscular system is also more fleshy on his back, where the porter house, sirloin and prime of ribs cuts are found.

According to a digram and scale of weights arranged a short time ago by Swift & Co., for Professor Mumford, of Missouri, a good 1200 pound beef steer will net about 708 pounds. At the present retail price for beef, 346 pounds including the porter house, sirloin, prime of ribs, rump and round would be worth $50.58, and 362 pounds including the neck, chuck, rib plate, flank, shin and shank would be worth $18.75, making $69.15 for the dressed carcass. It is seen that the back and hind quarters, while they form less than one-half the weight of the steer, still represent about three-fourths of the value of the whole carcass. The other parts are composed of low price cuts. Thus you see if the weight of the animal is mostly in the fore quarters, or lower parts of the body, the butcher cannot realize from him nearly so much as if his weight were situated where the high-priced cuts are found, and consequently will not pay as high a price.

If in any locality it seems desirable to produce beef alone, the breeder will turn to those breeds which produce beef with the least expenditure of energy in other directions; if it is desirable to produce milk primarily with beef as a side issue he will turn to such breeds as the Short Horns, the Galloways, the Red Polls, the Devon, or Brown Swiss. Where, of course, beef is of little consideration, the pure dairy breeds, like the Channel breeds, and the Holsteins, will be the ones raised.

It is frequently argued that it is impossible for animals of the beef type to produce milk economically, but the records of certain Short Horns and Red Polls are against such argument.

If an animal is of the proper form for beef making, the thing for the feeder to consider is the kind of feed which will be used most economically by that animal. As has been stated, American feeders must for the most part depend upon corn for the basis of their fattening rations. Corn alone, however, as is well known, does not form an economic feed. The animal needs something to furnish nitrogenous matter in larger amounts than it is possible to obtain it from corn in the quantities that may be digested under ordinary conditions. Oil meal, cotton seed meal and bran have been recommended to use in balancing the corn ration. Feeders who have fed corn alone and corn with bran, linseed meal or cotton seed meal with timothy hay, or corn stover for roughness, are pretty generally agreed upon the superior gains made by animals who were fed the more nitrogenous grain along with corn. All of these feeds, however, are rather expensive. It is desirable then to find some cheap nitrogenous feeding stuff to use along with corn stover, or corn ensilage for growing or fattening animals.

During the winter of '99 and '00 a trial was conducted at the Missouri Experimental Station with four lots of steers, to study the effects of different kinds of roughness on their growth, when they were fed only a small amount of grain. Three of the lots got four pounds of corn per steer daily. One lot received no corn. One lot was fed clover hay and corn stover with corn; one lot was fed cow pea hay with corn; one was fed timothy hay with corn; the other lot cow pea hay without corn. The lot fed clover hay and corn stover and corn made a total gain of 356 pounds, or an average daily gain of .88 pounds. The lot fed timothy hay and corn made a total gain of 260 pounds, or an average daily gain of .64 pounds per steer. The lot which was fed cowpea hay and corn made a total gain of 624 pounds, an average daily gain of 1.54 pounds. The lot which was fed cowpea hay with no grain made a gain of 288 pounds, an average daily gain of .56 pounds.

Growing steers on corn and cowpea hay gained almost two and a half times as much per day as on corn and timothy hay. Steers on cowpea hay alone gained almost as much as on timothy hay with corn. The cowpeas were of a late maturing variety and were cut before they had produced any pods, so that their superior feeding value could not be attributed to the grain which they contained.

A second trial with five lots of steers was conducted the next year, beginning January 29th, ending April 19, lasting 80 days. These steers were fed 6 pounds of corn daily per steer. One lot was fed timothy hay for roughness, the second lot was fed clover hay, the third lot was fed millet hay, the fourth lot was fed sorghum hay and the fifth lot was fed clover hay and corn stover. The steers fed timothy hay gained 318 pounds, practically one pound each per day. The steers fed clover hay gained 640 pounds, or 2 pounds per day. The steers fed millet hay gained 119 pounds, or .37 pounds per day. The steers fed sorghum hay gained 166 pounds, an average daily gain of .52 pounds. The steers fed stover and clover gained 433 pounds or 1.35 pounds daily per steer.

The millet and the sorghum hay were included in the test, because a great many farmers have been raising them as a sort of catch crop to furnish roughness during scarcity of other kinds of forage. The results of this trial were decidedly against both the millet and the sorghum hay. There is no special reason for growing millet and sorghum, as some of the varieties of cowpeas may be grown in as short a season as the millet or the sorghum. Cow peas have the advantage or adding fertility to the soil, while the millet and sorghum are both known to be very exhaustive. From the tests in supplementing corn stover with clover hay, it would appear that there is no great reason for feeding hay alone, when it may be supplemented by corn stover, and much larger gains be made than can be made with timothy hay, millet, or sorghum.

A thing which is often overlooked in wintering the animals is their future treatment. These animals were all turned the following summer upon mixed pasture, consisting for the most part of blue grass, red clover, timothy, white clover and orchard grass in about the order named. In general the animals which made the smallest gain during the winter made the largest gain the following summer. It would appear then that if these large gains were made at an increased expense or outlay of money, they might not be profitable, unless the feeding was kept up. If after being brought through the winter, animals are to be put on full feed to fatten during the summer, considerably more expense may be incurred in wintering them than if they are to be carried over. While the animals which made the poor gain during the winter made the best gains during the summer, they were never able entirely to overtake the ones which had got a good start during the winter. As these animals were all turned into the pasture in the spring, it is impossible to give any data concerning the amount of grass eaten by the different lots. The ones fed on the leguminous hays were much more nearly fat than the others, so that it would require much less feed and time to fit them for the market. These larger gains were made at actually less expense than the smaller ones, since amounts of clover and cowpea hay eaten were practically the same as that of the timothy hay and the timothy hay sells in the market for $1.00 or more per ton more than the others.

These animals were young and the gains made by them were chiefly growth and not fat. The food was used in building up muscle and other vital tissues, instead of laying up a reserve store of surplus material. It might be expected therefore that they would make much better gains on the nitrogenous fodders. It has been argued, however, that fattening animals have little use for nitrogenous food, and further that if it is fed it must be fed in the grains or concentrated portion of the ration. That the kind of roughness is immaterial and it serves only to distend the stomach and to aid digestion; that it is not itself digested; that all gain that is made comes from the grain. To test the soundness of these arguments, some tests were made with fattening steers.

Two lots of four steers each were put on feed December 16, '99 and fed until April 14, 1900, or 119 days. Each lot was given all the shelled corn it could eat, and the conditions were made as nearly the same as it was possible to make them, except for the kind of roughness fed. One lot was fed corn with timothy hay for roughness, the other was fed corn with cowpea hay for roughness. The two lots ate practically the same amount of roughness. The lot which was fed corn and timothy hay made a total gain of 802 pounds; the lot fed cowpea hay made a total gain of 1257 pounds. When timothy hay was used for roughness, it required 11.51 pounds of corn to make a pound of gain, and when cowpea hay was used, it required only 8.31 pounds of corn to make a pound of gain.

Realizing that a single test of this kind was not to be too much depended upon, a second trial was conducted the next year, beginning January 6, 1901, and ending April 16, 1901, 105 days. For roughness, the first lot was fed timothy hay; the second lot clover hay; the third lot cowpea hay; the fourth lot clover hay and corn fodder; and the fifth lot clover hay and wheat straw. The lot which was fed on timothy hay made a total gain of 789 pounds; the lot which was fed on clover hay made a total gain of 1135 pounds; the lot which was fed cowpea hay made a total gain of 1134 pounds; the lot which was fed clover and corn fodder made a gain of 1140 pounds; the lot which was fed clover and wheat straw made a total gain of 1073 pounds. In every case where the leguminous hay is fed, the steers ate larger amounts of corn than they did where timothy was fed but they also made larger gains. The steers fed on timothy hay required 11.19 pounds of corn for a pound of gain; those fed on clover hay required 8.69 pounds corn for a pound of gain; those fed on cowpea hay required 8.65 pounds of corn for a pound of gain; those fed on clover and corn fodder required 8.31 pounds of corn for a pound of gain, and those fed on clover and wheat straw required 9.21 pounds of corn for a pound of gain.

None of these gains are very remarkable, but they show at once the advantage of feeding nitrogenous roughness. Besides the advantage of producing more economic gains, there is another one in the more valuable manure produced. At the present price of nitrogen, phosphoric acid and potash, a ton of clover hay contains about $9.13 worth of fertilizing ingredients, a ton of cowpea about $8.13 worth, while a ton of timothy hay contains only about $5.36 worth and a ton of corn stover about $4.96 worth. Since 80 to 90 percent of the fertilizing ingredients were returned in the manure, the second advantage of the leguminous fodders is readily seen.

Cow peas have some advantage over clover. There is no difficulty in securing a stand; they make their growth in a shorter period of time and so may be used as a catch crop, besides the hay produced by them is not injured by rains to near the extent that clover hay is. Cowpea may be grown in as short a season as millet or sorghum and produces practically as large a yield. At the Pennsylvania State College last year, Early Amber sorghum produced 4337 pounds of dry matter per acre and Whip-poor-will cowpeas 4071 pounds or a little over two and a quarter tons of hay. The peas were sown May 28, and harvested about September 5.

The profits of beef production, as of any other production will depend largely upon the cost of the material used. A ration of timothy hay and bran, or oil meal having the same composition as clover or cowpea hay would under nearly all conditions cost decidedly more than the clover or cowpea hay. Clover and cowpea may in most cases be grown more cheaply than timothy, even without taking into consideration their benefit to the soil. If a stock grower can obtain the same results from the use of clover or cowpea hay that he can from the use of timothy hay with wheat bran or oil meal, he has increased his profits the difference in the cost of the two rations.

### Discussion.

Mr. Gamble: I would like to ask how many bushels of cow pea is sown to the acre, and how deep it is drilled in?

Prof. Mairs: We sow a bushel and a half to two bushels to the acre, of Whip-poor-wills. Of New Eras, we sow less because the seed is small. We put them in two or three inches deep.

Mr. Palmer: Have you any trouble with their falling down and growing as bush beans?

Professor Mairs: We did have some varieties of the cow pea that fell down and became matted when in drills thirty inches apart; but when they were put in with a wheat drill there was no difficulty at all.

Mr. Palmer: Do you not get more seed from the soy bean than from the cow pea?

Professor Mairs: Possibly you will get more seed from the soy bean than from cow pea. There is this difficulty with the soy bean; as soon as the bean gets ripe, in many cases the pods will drop off. This has been my experience about half the time.

Dr. Conard: You speak of sowing the cow pea late in May and harvesting it the first of September; could it not be sown earlier so there could be a longer time for harvesting?

Professor Mairs: Yes, you could sow the cow pea earlier, but it needs more warm weather for growing.

Dr. Conard: At about what state of growth do advise cutting the cow pea?

Professor Mairs: The time of cutting depends upon the variety of the seed. It ought not to be cut until September. It is cut with a mowing machine.

If it is a variety that matures seed, it should be cut about the time pods first turn yellow. If it does not mature seed, cut when the lower leaves begin to drop off. If there is danger of frost, cut earlier.

Mr. Lantz: I would like to know whether the cow pea can be cured for hay. In our section of the State many would have sown cow pea if it could have been safely cured.

Professor Mairs: That is a question which has come up before. We have tried a good many methods of curing them. We have cured them in shock which is most desirable, let them wilt, put them up in bunches and put covers over them, and have left them out for two weeks. Another method is to put a layer of straw, and a layer of peas or else a layer of rails and peas. We have cured them very satisfactorily in that manner. I have had no experience with curing them in the barn.

Mr. Martin: Have you had any experience in planting cow peas in alternate rows of corn?

Professor Mairs: I have had experience in planting cow peas in corn about the time the corn is laid by, but my experience has been unsatisfactory. Other people whom I know claim success. They also plant the cow peas with corn and put the whole thing into the silo.

Professor Plumb: I would like to ask if you have found the cow peas palatable to the stock, particularly to the cattle? I have had difficulty in having the stock eat this in silo. I have turned hogs in on the cow pea, and they would not touch it. The taste seemed to be unsatisfactory. I have had some correspondence with experimental stations and there has been some surprise at my experience.

Professor Mairs: The green pea vine is not eaten at first by the average cow or horse, but I have had no difficulty so far in getting the hay eaten. The animals fed this hay ate it up absolutely clean, and would eat the stalk that had been out in the rain. As far as the pigs were concerned, I know we had considerable difficulty in keeping them from breaking in where the pea was being fed to other stock.

Professor Plumb: In my experience there are two classes of cattle that will eat the cow pea; those used to scanty rations, and those with ordinary fare. High fed cattle will not eat it.

Mr. Barber: I have had practically the same experience as others with the cow pea, but last year I planted more than ever before. The cattle do not like it green. I never did much with horses, but have found by experience that whether you feed them well or not they become very fond of cow pea and will take it green after a little bit of education.

Mr. Cloud: I have had some half dozen different kinds of cow pea in a small way, and probably about the middle of July I would plant two rows across the truck patch. I found that the cows eat everything, even the roots. I have had one or two dairymen tell me that when they run short of pasture they have had good results by putting the cows on the cow pea. I would be afraid to undertake to make hay of the cow peas that I grow; many of the stalks are as thick as my finger; but there is no trouble about the stock eating it.

Mr. Smith: In the South the cow pea is very popular, and I have come into contact with a great many farmers who praise it as a plant and as hay. There seems to be no definite answer to the question how to cure it. Pardon me if I make a few suggestions. The plant in its early stage is very sappy and you find the stock do not like it, but at a later stage when the pod is pretty well filled, then the oxen, cows, and horses eat it. In curing our process is to cut with sythe ifthe crop is very rank. Place the scythe around so that it will cut the swaths apart so that they can be handled better. After the vine is wilted we pile it up and leave it until it heats. We next open the stack, and that evening before dew falls we cock them up again. The next morning we proceed the same way and haul them in that day. Put them in the mow. The sap will cause them to get hot, and the moisture will pass away and they make a rich food.

I have learned from Professor Massey of the South Carolina Station that there is a large amount of nitrogen in the vine which causes the cows to be so fond of it.

Professor Mairs: I would like the opinion of this audience in regard to alfalfa, and to know how many are growing it largely.

Mr. McSparran: I have been impressed with the results of my raising alfalfa. Last Spring a year I prepared a fine piece of ground with extraordinary care and sowed alfalfa. It came up reasonably well and I started a mowing machine around it according to instructions and succeeded in cutting down weeds and alfalfa with the result that the low down plantain had destroyed all the alfalfa. Last spring I again sowed alfalfa and have a fairly good stand, about 6 in. I think it will make a crop for at least the winter.

Mr. Martin: I planted an acre of alfalfa two years ago in the month of June. It immediately grew, covered the ground thoroughly, and in ten weeks after planting I mowed it all. It was a foot high or more. The ground was raked over carefully. The crop was mown three times, the last time in October. I took no account of the weight of the crops. Last season my experience with the crop was not just so successful. The weeds got mixed in and caused some discouragement. However, when the snow began to fall, the alfalfa had grown after mowing four inches high. The subsoil is an open gravel, and the alfalfa roots had reached down four feet into this soil. I am free to say that, given proper location with an open subsiol, free from standing water, alfalfa can be successfully grown in Pennsylvania.

# The Value of a Pedigree.

## By Prof. Geo. C. Watson,

of Penn'a State College.

The term "pedigree" is generally accepted as meaning a written description of lineage or ancestry. The endeavor to trace lineage or relationship to some noted individual undoubtedly led to the development and complete record of lineage of many of our domesticated animals, which extend through many generations of time.

Without doubt the ancients placed considerable value on the lineage of their animals. It is known that they considered some animals far superior to others for the purpose for which they were at that time used. It is also known that one of the earliest recognized principles of stock-breeding, "Like begets like," helped, perhaps, more than did any other principle to give to pedigree the importance which has been accorded to it.

As the animals which formed a considerable part of the possessions of man become more valuable through the advancement of civilization, more dependence was placed upon the usefulness of these servants of man. It is only natural to suppose that the continual increasing value of domesticated animals fostered a continual increasing desire on the part of the owners to trace the lineage of their animals to individuals of recognized merit. It was the descendants of noted animals that first claimed the benefit of any guarantee of value, written or legendary, which pedigree afforded.

As the pedigrees were first written of animals which descended from noted stock, the idea of superiority was at an early timea ssociated with written lineage. This idea of superiority has not been wholly confined to the lineage of domestic animals. Many families of the human race set themselves up on more or less lofty pinnacles, and hold themselves somewhat aloof from other families or tribes because of their superior lineage. To the minds of many, this implies that at some time the original stock from which they descended was supposed to have been "made out of a little better clay" than the common stock from which ordinary mortals have descended. Without doubt the so-called "Divine right of kings" has, in some measure, been the outgrowth of the superiority guaranteed by that which we now recognize as pedigree.

For the convenience of study and discussion, that which is implied in the popular word "pedigree," may be considered under two quite distinct and somewhat widely-separated divisions, as:

1. A means of tracing lineage only.
2. A guarantee of superiority.

The published records of lienage as now preserved by the various associations, which have for their subject the advancement of the interests of various breeds of live stock, afford a more or less accurate and reliable means of tracing the lineage of recorded animals through many ancestral generations. It is a matter of somewhat common information that some associations guard the integrity of published statements, regarding lineage, much more closely than do other associations. Consequently the published statements of some associations carry a much more worthy guarantee than do those that are not so carefully guarded. As all men are not equally honest, laxity on the part of the associations has afforded the unscrupulous an opportunity to defraud his co-worker or co-breeder of his legal and just rewards. As some pedigrees are known to be faulty and unreliable, the reflection on others that are trustworthy becomes more or less serious.

With pedigrees as with individuals in society, the kind of company that is kept affords a measure of value as to standard and conduct. As the usefulness of many recorded pedigrees has become somewhat impaired through the association with fraudulent ones, it is for the honest, straightforward and progressive breeders to unite and to adopt sufficiently stringent rules and regulations for registrations that will reduce fraud and imposition to the minimum. In order that the recorded lineage of domestic animals may become of the greatest service to the live-stock breeders of the country, the integrity of the statements made must be most carefully guarded. If a reasonable doubt exists as to the correctness of some, the value of all records is more or less impaired.

As a guarantee of superiority, the published pedigrees of animals of various pure-breeds occupy decidedly uncertain positions. In the minds of many inexperienced breeds, an assurance that an animal is eligible to registry or has been recorded is accepted as a guarantee of superiority. Without doubt many farmers purchase registered stock feeling that the registration certificate, to some degree at least, guarantees to them a superior animal or animals as the case may be.

Registered animals frequently fall into the hands of unskilled breeders, who permit the improvement which the breed may once have possessed to deterioate until the registered animals for purposes of utility are no better than the common stock of the country that lays no claim to superior lineage. This degenerated stock is credited with registration numbers, and produces progeny that show perhaps still further deterioration, although they may be recorded side by side with the best animals that are known to that particular breed.

Deterioration may go on from generation to generation as the registration numbers increase. The unskilled breeder, who is unfamiliar with the story which the pedigree is supposed to tell, finds through a disappointing experience that he has little guarantee in the registration certificate. Many farmers and breeders seem to forget that the improvement, which has been produced in so many breeds of pure-bred stock, was obtained at great cost through years of patient toil in maintaining, what we now recognize as the foundation-stock, under the most congenial conditions. As improvement was made through congenial conditions as regards food, shelter, care, etc., the improvement will become less with each succeeding generation, if the congenial conditions are supplanted by improper food, exposure and neglect. It is a matter of somewhat common observation to find registered animals maintained on many farms in a condition that will bring discredit, not only to the improved breeds of stock, but to well-kept, common stock of the country.

Under the existing conditions, is it not evident that one of two courses must be adopted if the value of registration is not to be permitted to further deteriorate? Either the conditions under which many registered animals are maintained must be improved, in order that the value of these machines for useful purposes may not diminish, or a separation of the worthy from the unworthy must be accomplished.

For generations much stress has been laid upon pedigree, and comparatively little has been heard of the necessity of providing better food for the improved classes of live stock. Very many farmers purchase animals of improved breeds thinking that if the improvement is good for anything that it will prove beneficial to them if they maintain the improved animals under the same condition which their common stock has been maintained for generations.

When a meritorious, well-cared-for individual of an improved breed is suddenly transferred from congenial surroundings, provided by the hand of a successful breeder and feeder, to the uncongenial surroundings, marked by neglect and deprivation, a decline is at once inaugurated. The animal in question may have what we call "sufficient vital force" to carry it along for a few years with greater profit to the owner than is produced by other animals that have been maintained during their whole lives under similar, uncongenial conditions.

At first the farmer, who has just purchased, is highly pleased with the change, and praises the advantages of pure-bred stock. But later, as his stock deteriorates, his enthusiasm wanes.

To still further illustrate, many conditions which are found in Pennsylvania and other States, we will suppose that the animal just mentioned was a highly-prized cow. She has a calf which is highly prized by the owner, and is given somewhat better food than he is accustomed to give his unimproved stock, although the care and food given to the calf falls far short of that which was given to the cow while she was a calf. Consequently the calf of this cow does not develop and become an equal to her mother. In turn this heifer-calf is bred, perhaps, to a registered animal of the neighborhood that is no longer worthy to be called a representative of an improved breed. The resulting calf is not so highly prized as were those of previous generations, and consequently is not so well cared for. This method of breeding and feeding is repeated with successive generations until the level or plane is reached which the food and care ,that is provided, will maintain. As the spring will not rise higher than its source, neither will an insufficient amount of skim milk and poor pasture in "fly" time, followed by uncongenial conditions of winter feeding, develop the most economical milk producing machine. But these negligent breeders state that their animals are hardy and are endowed with a strong constitution, and further say that it is freely asserted by eminent authorities that " acertain amount of exposure is conducive to hardihood, and to the development of a strong constitution." They point to the many illustrations in nature to support this assertion ,and even include tribes and races of men that are subjected to vavious degrees of exposure and hardship. Those that are most protected from the rigors of winter, and lead lives of ease and luxury, are not noted for their powers and physicial endurance, nor for their longevity. Without doubt a certain amount of exposure tends to develop a strong constitution, which will enable the individual to withstand hardships and privations that might bring disastrous results to a weaker constitution. Strength of constitution in domestic animals is of great importance, but extreme development is undesirable. It is important that our improved breeds of domestic animals be strong and vigorous. The modern tendency is toward extreme production along useful lines, although the life of the machine may be shortened thereby. In order that the extremes of usefulness may be reached, it is necessary that the animals be endowed with strength and constitution, which will enable them to withstand severe and hard work along the useful lines for which they have been developed and for which they are maintained.

The many tests of production, with dairy animals especially, have shown clearly that the weak-constitution animals succumb first. Those that are not able to withstand the terrific strain which the feeders impose upon them, succumb to one or more of the various forms of weakness, which do not adversely affect animals of stronger constitutions, although they may be subjected to precisely the same treatment.

While strength of constitution is of great importance in our domestic animals which are subjected to greater hardships and privations with many species of wild animals the strength of constiution is an all-important consideration. These animals have been bred for hundreds of generations in a manner which is intended to develop the strongest constitutions. Almost without exception those wild animals, which are the strongest and most vigorous, leave the largest number of progeny. Of these, the most vigorous again in turn become the most prolific breeders. This process of natural selection, which has been styled "the survival of the fittest," is of comparatively much more importance with the wild animals than with the improved breeds of domesticated stock. Stock breeders have sometimes applied the term "survival of the fittest" to improved animals, meaning that to those animals which are best suited for purposes of utility should fall the lot of continuing the breed or propagating the species.

The cow having the most vigorous and robust constitution of any in the herd is not likely to be the greatest producer, neither is she so likely to remain in the herd as a breeder for the longest time. As long as animals are well cared for the extreme strength of constitution is not so desirable as the extreme development of useful qualities. There seems to be a somewhat general law in nature that prevents the extreme development of useful qualities along two or more quite widely-separated lines. If the energies of the individual are turned toward the development or production of useful products, this desirable quality is reached at the expense of some other quality that may be all-important under different conditions. Consequently the extreme production of useful products, and the extreme vigor of constitution, are not found in the same individual. The farmer who causes his live stock to be exposed to severe, climatic conditions, and fails to furnish a bountiful supply of nutritious food, develops a tendency in his animals towards production of strong constitution, whi production of strong constitution, which will enable his animals to withstand best the trials and deprivations to which they are subjected.

As this quality develops slowly, though it may be, from generation to generation, the useful quality for which the animals are maintained will correspondingly decline until a condition is reached which will be maintained without perceptible increase or decrease under the existing conditions. In other words, nature has accommodated herself to the existing conditions and an equilibrium has been restored. As nature endeavors to maintain what is frequently called an "equilibrium." man frequently endeavors to destroy it. He changes the conditions in order that certain features may be increased or diminished according to his wants or fancy. As these conditions are permitted to relapse toward the state of nature. The improvements which he effected must necessarily approach the natural conditions which existed before he disturbed nature's equilibrium.

The breeders of live stock have improved domesticated animals for their own use far in excess of that provided by nature. This improvement has been secured through more or less artificial conditions. As these artificial conditions are partially or wholly neglected, the improvement retrogrades. The usefulness of the improved breeds of horses, sheep, cattle, swine and poultry has been secured largely through the agency of improved, artificial conditions. Improved care, improved feeding, together with congenial surroundings have fostered and developed that which cannot be maintained if the care is withdrawn. Deprivation and hardship are antagonistic to the high development of useful qualities. The careless and indifferent breeder, or careless and indifferent feeder, permits the animals which he produces, through generations of breeding, to become less-economic machines for the purposes for which they are kept. As improved machines demand improved conditions, so do improved animals require improved and congenial surroundings for their maintenance.

The pioneer farmer who cleared his farm from the primitive forests, found it necessary to work with crude, rude and strong implements. They were heavy, cumbersome and inefficient from the standpoint of modern improvements. As the old-fashioned "A" drag, manufactured perhaps from the fork of a tree, has given way to the smoothing-harrow and the spring-tooth; so has the animals of early times, that were little removed from the state of nature, given place to more useful improved breeds of domesticated stock. Both the improved stock and the improved implements require to be used and maintained under superior conditions. Unless improvements are maintained, retrogression is inevitable.

Is it not true that hundreds and thousands of animals in this country have been maintained for generations

under unfavorable conditions, and that deterioration has resulted? While these animals have been recorded in published registries or herd-books, their usefulness has become so much impaired that for practical purposes many of them are no better than the common stock of the country, which makes no boast of breeding and to which registration is denied. Animals of improved breeds, which should be synonymous with pure-bred stock, should be superior for usefulness.

Registration should be a guarantee of useful qualities; but until some higher standards are required, the shiftless, negligent breeder will profit at the expense of the skilled and the trustworthy.

The statement is made in the first volume of the English Racing calendar that a creditable performer is well bred, it being taken for granted that a horse could not be a notable performer on the turf that was not well bred. This assumption is still held by horsemen, and is rarely if ever found at fault. While this assertion, sweeping as it may seem to be, acknowledges the capacity of well-bred animals for well doing, to be superior to that of animals of common or mixed breeding, it does not in any way guarantee the power of well doing for all registered stock. So the term "registered stock" may or may not assure superiority.

Improved stock, like improved mechanical appliances, is most economical under favorable conditions. If improved animals are maintained under adverse conditions for generations, they may become extremely dangerous as breeding-stock. These animals, if maintained for many generations until marked deterioration has resulted, will undoubtedly transmit their undesirable qualities to a greater certainty than will those of common or mixed breeding. This recognized fact has led to the enunciation of the somewhat well-known truism, that there is nothing so dangerous as a "scrub thoroughbred." The term "thoroughbred," in this connection, is undoubtedly used somewhat loosely to indicate pure-bred or registered stock.

Deteriorated pure-bred stock may become, for breeding purposes, the most dangerous of all stock.

It is the object of this paper to present some of the dangers which confront many inexperienced breeders, and the pit-falls which have wrecked the high aspirations of amateurs and brought discredit on truly-representative and meritorious animals. As long as many farmers and amateur breeders are denied the opportunity of studying the pedigrees of animals in their true light and depend on the registration certificate for the guarantee of excellence, there is sure to be disappointment and failure in many quarters. Pedigrees should be studied for the story which they tell. They simply tell a story of the lineage, and in some cases, performances of ancestors. If a pedigree tells a good story, it should be accepted as a good pedigree. In order to be a good pedigree, there must occur the names of meritorious animals all along the line, more especially in the recent generations. A good pedigree gives some assurance of superiority. Until an unskilled breeder can have some assurance of superiority in pedigree, the greatest good and the highest development of improved stock will not be reached. When better feed and better care are enforced for a larger number of animals, the more rapid will be the development. The greater the number of animals that are maintained under the conditions that are worthy of improved stock, the greater will be the number of markedly superior animals that will be produced, and consequently the greater the advancement of the breeds which these animals represent. Until some creditable performance is required for registration, many inferior animals will be recorded side by side with the meritorious. As long as inferiority and superiority are given the same registration guarantee, comparatively few breeders are in position to read aright the story which has been recorded. Already some associations require certain performances for registration, recognizing the principle that an animal is good or poor according to its power to produce. Other associations will undoubtedly find it necessary to adopt some similar method of weeding out the undesirable and dangerous breeding stock, in order that a recorded pedigree may afford a greater guarantee of superiority. If the pedigrees published by an association can be accepted as a guarantee of superior merit, registered stock will receive recognition by the breeders throughout the country that has been accorded it in the past. Is it not for the breeders of the present and future generations to require a higher standard of excellence for registration if the greatest good is to be accomplished by the various associations which are now endeavoring to advance the interests of the various breeds which they represent?

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## Report of the Committee on Nominations.

Mr. W. G. Powell: The Committee is unanimous in the opinion that with a good man in a good place, it is best to keep him there, for a time, at least. In view of that we have made no changes in the officers, except to fill vacancies. Your Committee offers the following nominations:

President, W. C. NORTON,
Aldenville.

1st V. P. HENRY PALMER.
Avondale.

2d V. P., M. P. SHOEMAKER,
Greensburg.

Secretary, E. S. BAYARD,
East End, Pittsburg.

Treasurer, J. F. LANTZ,
Isabella.

**Executive Committee.**

W. G. POWELL,
Shadeland.

EDWARD WALTER,
West Chester.

D. NORMAN APP,
Selin's Grove.

WILLIAM BERRY,
Washington.

GEORGE C. WATSON,
State College.

H. A. FIELD,
Wellsboro.

The officers of the Association, ex-officio.

**Committee on Fairs.**

W. C. BLACK,
Mercer.

J. L. HENDERSON,
Washington.

W. F. HOLTZER,
Greensburg.

**Legislative Committee.**

H. W. COMFORT,
Fallsington.

DR. THOMAS TURNBULL,
Allegheny.

R. L. MUNCE,
Canonsburg.

W. F. CABLE,
Altoona.

WILLIAM R. WILLIAMS,
Philadelphia.

The President and Secretary, ex-officio.

**Committee on Transportation.**

DR. LEONARD PEARSON,
Philadelphia.

T. E. ORR,
Beaver.

DR. J. CHESTON MORRIS,
West Chester.

F. J. McCAIN,
Mercer.

JOS. T. FLEMING,
Bellville.

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It was moved and seconded, and unanimously carried that the gentlemen named by the Nominating Committee be elected for the year.

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Hon. W. C. Norton: I thank you, gentlemen, for the honor.

## Upon motion the following Resolutions were passed :

WHEREAS, the Governor and State Board of Live Stock Commissioners of Illinois, have established restrictions upon the movement of cattle from Pennsylvania to Illinois, on account of the foot and mouth disease in some of the New England States, have made quarantines and announcements that may readily create the impression that the cattle of this State are infected, and say explicitly, in an official document, that the infection is extremely likely to spread to the "bordering and adjacent" State of Pennsylvania, and they have scheduled Pennsylvania with the infected New England States, and

WHEREAS, there is absolutely no valid ground for this action, since thre is no foot and mouth disease in Pennsylvania nor in any bordering or adjacent State, and there is no more danger that the disease will occur here than in any other State now uninfected and,

WHEREAS, the unwarranted action of the authorities of Illinois is likely to create abroad the false impression that the foot and mouth disease infection is much more widely distributed than is in fact the case, and that the force and measures employed in suppressing it are not sufficient for the task, and that the territory adjacent to the ports still free for the export of cattle is in imminent danger of infection, thus seriously hampering or destroying American export trade in live animals, be it.

Resolved, That we, the Pennsylvania Live Stock Breeders' Association, and the State Dairy Union, in joint meeting assembled, severely condemn the action of the Governor and State Board of Live Stock Commissioners of Illinois who alone of all similar State authorities have by their hasty action without sufficient investigation created unnecessary alarm and distrust in respect to the foot and mouth disease situation. Furthermore, their acts might readily have led to an enormous if not an irreparable injury to the live stock interests of the United States, and that this did not result is, in our opinion, due largely to the immediate counter action taken by the State Live Stock Sanitary Board of Pennsylvania, be it further

Resolved, That we hereby recommend to the Governor and Board of Live Stock Commissioners of Illinois that they remove Pennsylvania from their list of scheduled States and rescind all restrictions upon the movements of cattle from this State to Illinois, to the end that the fact may be made clear that export cattle passing Eastward through Pennsylvania are not exposed to more danger of foot and mouth infection than they are in other uninfected States, as, for example, in Illinois.

(Signed)
Jesse K. Cope,
J. D. Detrich,
Austin Leonard,
for the Dairy Union.
W. C. Norton, Pres. Pa. Live Stock Breeders' Ass'n.,
E. S. Bayard, Sec. Pa. Live Stock Breeders' Ass'n.

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WHEREAS, Dr. Leonard Pearson has with marked ability and fidelity filled the position of Secretary of the Pennsylvania Live Stock Sanitary Board, and whereas, his term of office is now about to expire, therefore, be it

Resolved by the Pennsylvania Dairy Union and the Pennsylvania Live Stock Breeders' Association in joint convention assembled, that we heartily endorse Dr. Pearson for re-appointment to the same office.

Mr. J. D. Detrich: I move that this Association ask for an appropriation of $1,000.

The President: I think that would have to come through the Agricultural Department.

Professor Hamilton: I want to say for the information of those here, that which I announced yesterday, that I expect to ask for an appropriation for the expenses of this organization as well as for those of the Dairy Union, and the State Horticultural Society. I think all these organizations ought to be supported in part by the State. I made such a request before, but it was turned down in Committee. I think this time, however, the appropriation can be secured.

Mr. Detrich's Resolution was seconded and carried.

Professor Hamilton: I want to say that I am greatly interested in the success of this organization, not simply for the purpose of bringing together men interested in similar occupations and business interests, but because of the influence they have in the several communities in building up the stock industry of Pennsylvania. I am having a bulletin prepared now for the Department of Agriculture that is to discuss the question of our production of animals for the market in this State. The gentlemen who is to prepare this bulletin is thoroughly equipped.

I want to say further that I intend to make a recommendation to the Governor looking toward the improvment of our County Fair associations. I think each one of these should take an interest in the building up of the live stock industry of our State. One of the difficulties in carrying out the teachings of Professor Plumb and other gentlemen who have spoken here is because we do not have in the communities in which many of us live the opportunity of making a selection of the animals we desire to breed. We may have information of what we need, but the animals are not within our reach. I believe that the County Fair associations should own at least some of these animals so that breeders could secure the services of typical animals of high grade. I think such an arrangement would be a good investment for the associations. I am going to ask for some legislation that will enable the Department of Agriculture to bring about that condition of affairs. At the proper time I want the co-operation of every member of the Pennsylvania Live Stock Breeders' Association, and of the Dairy Union; also of other men interested in the development of the live stock industry of Pennsylvania.

The President: I wish to thank you again, gentlemen, for the honor of re-electing me President. I think many men would have served better, have brought more influence to bear, and done more good for the Association. I, however, again thank you.

Upon motion the Association adjourned to meet at the call of the Executive Committee.

# WHAT WE BREED.

Pure Bred Stock Bred by Members of the Pennsylvania Live Stock Breeders' Association.

## HORSES.

### THOROUGHBREDS.

| Name | Postoffice. | County. |
|---|---|---|
| R. S. Hartley | Dugall | Warren |

### STANDARD BREDS

| | | |
|---|---|---|
| H. C. & M. R. Elder | Darlington | Beaver |
| W. A. McCoy & Sons | Mercer | Mercer. |
| Henry Palmer | Avondale | Chester. |
| Ezra Michener | Michener | Bucks |
| Powell Bros. | Shadeland | Crawford |
| W. H. Ridge | Trevose | Bucks. |
| Ridge Farm (W.C.Norton) | Aldenville | Wayne. |
| W. H. Rink | Jennerstown | Somerset. |
| W. E. Stevenson | Burgettstown | Washington. |

### FRENCH COACH.

| | | |
|---|---|---|
| Geo. Erk | Seelyville | Wayne. |
| Powell Bros | Shadeland | Crawford |

### HACKNEYS.

| | | |
|---|---|---|
| Powell Bros | Shadeland | Crawford |

### CLYDESDALES.

| | | |
|---|---|---|
| H. C. & M. R. Elder | Darlington | Beaver |
| Powell Bros | Shadeland | Crawford |

### PERCHERONS.

| | | |
|---|---|---|
| E. B. Boyle | Canonsburg | Washington |
| W. A. McCoy & Sons. | Mercer | Mercer. |
| Powell Bros. | Shadeland | Crawford |

### SADDLE HORSES.

| | | |
|---|---|---|
| Julius LeMoyne | Washington | Washington. |

### ENGLISH SHIRES.

| | | |
|---|---|---|
| Powell Bros | Shadeland | Crawford |

### CLEVELAND BAYS.

| | | |
|---|---|---|
| Powell Bros | Shadeland | Crawford |
| Nelson Spedding | Clifford | Susquehanna |

### SHETLAND PONIES.

| | | |
|---|---|---|
| Wm. F. Gable | Wyebrooke | Chester |
| Powell Bros. | Shadeland | Crawford |
| W. H. Rink | Jennerstown | Somerset. |
| W. M. Thompson | Uniontown | Fayette |

## CATTLE.

### SHORTHORNS.

| Name | Postoffice. | County. |
|---|---|---|
| W. C. Black | Mercer | Mercer. |
| John Cummins | Cummins | Greene. |
| E. M. Campbell | Leech's Corners | Mercer |
| Eagley Bros. | North Springfield | Erie. |
| W. A. McCoy & Sons | Mercer | Mercer. |
| R. L. Munce, | Canonsburg | Washington |
| W. J. Monroe | Delmont | Westmoreland |
| B. L. Post & Sons | Claysville | Washington |
| Pa. State College | State College | Center. |
| Geo. D. Rutter | York | York. |
| Lee R. Scott | Burgettstown | Washington. |
| A. G. Shaffer | Atwood | Armstrong. |
| T. M. Shively | Mifflinburg | Union |
| John D. Smith | Castile | Greene. |
| S. W. Solenberger | Chambersburg | Franklin. |
| W. L. & Geo. S. Strosnider. | Cummins | Greene |
| Thos. Turnbull, Jr., | Monaca | Beaver. |
| W. M. Thompson | Uniontown | Fayette |
| J. R. Truxal | Mutual | Westmoreland. |
| R. C. Vance | Burgettstown | Washington. |
| A. S. Worden | Ulysses | Potter. |
| T. M. McKee | Lewistown | Mifflin |
| F. J. McCain | Mercer | Mercer |
| L. D. May | Granville Center | Bradford |

### POLLED DURHAMS.

| | | |
|---|---|---|
| Chas. Buchanan | Utica | Venango |
| Albert DeFrance | Sandy Lake | Mercer. |
| Horace A. Field | Wellsboro | Tioga. |
| J. C. Mattern & Sons | Hollidaysburg | Blair |

### RED POLLS.

| | | |
|---|---|---|
| D. Norman App | Selin's Grove | Snyder. |
| B. E. Ferris | Hector | Potter |
| L. D. Grove | Holbrook | Greene. |
| T. M. Shively | Mifflinsburg | Union. |
| N. O. Brownlee | Claysville | Washington |
| R.W. Crcthers & Son | Taylorstown | Washington |

### ABERDEEN-ANGUS.

| | | |
|---|---|---|
| Geo. Black | Plumville | Indiana |
| Bayard Bros. | Waynesburg | Greene |
| James Blair | Espyville Station | Crawford. |
| Penn'a State College | State College | Center |
| W. H. Rink | Jennerstown | Somerset. |

### DEVONS.

| | | |
|---|---|---|
| L. K. King | Westfield | Tioga |
| J. Cheston Morris | West Chester | Chester |
| Powell Bros | Shadeland | Crawford |
| A. S. Worden | Ulysses | Potter. |

### HOLSTEINS.

| | | |
|---|---|---|
| J. L. Henderson & Son, | Washington | Washington. |
| H. M. Lyon & Son. | Spring Hill | Bradford |
| Miller Bros. | Stonybrook | York. |
| J. M. Quivey | Houston | Washington |
| Powell Bros | Shadeland | Crawford |
| W. E. Stevenson | Burgettstown | Washington. |
| V. W. Johnston | Clymer | Tioga |

### JERSEYS.

| | | |
|---|---|---|
| Geo. S. Barnhart | Greensburg | Westmoreland. |
| J. C. Bebout | Canonsburg | Washington |
| F. C. Bosler | Carlisle | Cumberland. |
| E. B. Boyle | Canonsburg | Washington |
| Jno. H. Burgin. | Huntingdon Valley | Montgomery |
| Leonard & Son | Troy | Bradford |
| R. I. Young | Middletown | Dauphin |
| Geo. Erk | Seelyville | Wayne. |
| H. C. & M. R. Elder | Darlington | Beaver |
| C. W. Gammell | Bethany | Wayne. |
| R. S. Hartley | Dugall | Warren |
| Wm. W. Harrison | Glenside | Philadelphia. |
| Chas. W. Henry | Chestnut Hill | Philadelphia. |
| W. F. Holtzer | Greensburg | Westmoreland. |
| G. H. Knapp | Aldenville | Wayne. |
| J. F. Lantz & Co. | Barneston | Chester. |
| L. W. Lighty | East Berlin | Adams. |
| J. M. Main & Sons, | Shippensburg | Cumberland. |
| Robert McCoy | Slippery Rock | Butler |
| Benj. W. McKeehan | Mt. Rock | Cumberland |
| A. L. Martin | Harrisburg | Dauphin. |
| W. F. McSparran | Furniss | Lancaster. |
| S. E. Nivin | Landenburg | Chester |
| J. C. Peck | Carbondale | Lackawanna. |
| Perham Bros. | Niagara | Wayne |
| Henry M. Phillips | Pittsburg | Allegheny |
| Powell Bros | Shadeland | Crawford |
| Ridge Farm | Aldenville | Wayne. |
| R. F. Shannon, | Edgeworth Station | Allegheny. |
| W. F. Shrum | Adamsburg | Westmoreland |
| M.P.Shoemaker & Bro., | Greensburg | Westmoreland. |
| Edward Walter | West Chester | Chester. |
| A. P. Warren | Elizabeth | Allegheny. |
| Wm. R. Williams | Germantown | Philadelphia. |
| J. B. Wylie | Washington | Washington |

### GUERNSEYS.

| | | |
|---|---|---|
| Henry Palmer | Avondale | Chester |
| R. S. Hartley | Dugall | Warren |
| H. C. Bughman | Pittsburg | Allegheny |
| H. W. Comfort | Fallsington | Bucks |
| Wm. F. Gable | Wyebrooke | Chester |
| Henry Palmer | Avondale | Chester. |
| Pa. State College, | State College | Center. |
| Nelson Poorbaugh | Mt. Pleasant | Westmoreland. |
| W. H. Ridge | Trevose | Bucks. |
| W. S. Stevenson | Butler | Butler. |
| Hon.J.F.Woodmansee, | Lake Como | Wayne. |
| Shook Bros | Spring Mills | Center |
| Ezra Michener | Michener | Bucks |
| F. E. Traver | Wyebrook | Chester |
| H H Snavely | Lancaster | Lancaster |

### AYRSHIRES.

| | | |
|---|---|---|
| Thos. Turnbull, Jr. | Allegheny | Allegheny |

### HEREFORDS.

| | | |
|---|---|---|
| J. I. Barley | Baker's Summit | Bedford. |

### POLLED ALBIONS.

| | | |
|---|---|---|
| B. E. Ferris | Hector | Potter. |

### BROWN SWISS.

| | | |
|---|---|---|
| R. I. Young | Middletown | Dauphin |

## SWINE.

### POLAND CHINAS.

| Name. | Postoffice. | County |
|---|---|---|
| D. Norman App | Selin's Grove | Snyder |
| J. I. Barley | Baker's Summit | Bedford. |
| H. C. Bughman | Pittsburg | Allegheny |
| Burns & Adams | Clinton | Alegheny. |
| Eagley Bros. | North Springfield | Erie. |
| H. C. & M. R. Elder | Darlington | Beaver |
| L. D. Grove | Holbrook | Greene. |
| L. D. Harrington | North Water Gap | Monroe |
| W. A. Lothers | Lack | Juniata. |
| Henry Palmer | Avondale | Chester |
| Robert McCoy | Slippery Rock | Beaver |
| Miller Bros | Stonybrook | York |
| B. L. Post & Sons | Claysville | Washington |
| Nelson Spedding | Clifford | Susquehanna |
| T. M. Shively | Mifflinburg | Union |
| A. G. Shaffer | Atwood | Armstrong. |
| A. P. Warren | Elizabeth | Allegheny. |
| J. B. Wylie | Washington | Washington |
| T. M. McKee | Lewistown | Mifflin |

### TAMWORTHS.

| | | |
|---|---|---|
| F. C. Bosler | Carlisle | Cumberland. |
| R. S. Hartley | Dugall | Warren |
| Henry Palmer | Avondale | Chester |
| Ridge Farm | Aldenville | Wayne. |
| M P.Shoemaker & Bro., | Greensburg | Westmoreland. |

### CHESTER WHITES.

| | | |
|---|---|---|
| Geo. S. Barnhart | Greensburg | Westmoreland. |
| E. B. Boyle | Canonsburg | Washington |
| H. C. Bughman | Pittsburg | Allegheny. |
| J. Grier Dain | Malvern | Chester. |
| Jos. T. Fleming | Bellville | Mifflin. |
| Wm. F. Gable | Wyebrooke | Chester |
| H. M. Lyon & Sons | Spring Hill | Chester |
| J. F. Lantz & Co. | Barneston | Chester. |
| W. A. McCoy & Sons | Mercer | Mercer. |
| B. W. McKeehan | Mt. Rock | Cumberland. |
| J.C.Mattern & Sons, | Hollidaysburg | Blair |
| W. J. Monroe | Delmont | Westmoreland. |
| R. L. Munce | Canonsburg | Washington. |
| Edward Walter | West Chester | Chester. |
| A. P. Warren | Elizabeth | Allegheny. |
| Hon.J.E.Woodmansee, | Lake Como | Wayne. |
| Shook Bros | Spring Mills | Center |
| M.P.Shoemaker & Bro., | Greensburg | Westmoreland. |
| J. R. Truxall | Mutual | Westmoreland. |

### BERKSHIRES.

| | | |
|---|---|---|
| George Black | Plumville | Indiana. |
| W. C. Black | Mercer | Mercer. |
| Jno. H. Burgin | Huntindon Valley | Montgomery. |
| E. M. Campbell | Leech's Corners | Mercer |
| Jas.L.Henderson & Son, | Washington | Washington. |
| W. F. Holtzer | Greensburg | Westmoreland. |
| L. W. Lighty | East Berlin | Adams. |
| W. A. Lothers | Lack | Juniata. |
| J. M. Main & Sons | Shippensburg | Cumberland |
| S. V. McDowell & Sons | Fredonia | Mercer |
| W. F. McSparran | Furniss | Lancaster |
| Pa. State College, | State College | Center. |
| Nelson Poorbaugh, | Mt. Pleasant | Westmoreland. |
| Ridge Farm | Aldenville | Wayne. |
| W. H. Rink | Jennerstown | Somerset. |
| R. F. Shannon | Edgeworth Station | Allegheny. |
| Thos. Turnbull, Jr., | Monaca | Beaver. |
| Shook Bros | Spring Mills | Center |
| A S. Worden | Ulysses | Potter |
| N. O. Brownlee | Claysville | Washington |
| R. W. Crothers & Son, | Taylorstown | Washington |

### DUROC JERSEYS.

| | | |
|---|---|---|
| George Black | Plumville | Indiana |
| John Cassidy & Son | Hanlin Station | Washington |

### YORKSHIRES.

| | | |
|---|---|---|
| V. W. Johnston | Clymer | Tioga |

### ESSEX.

| Name. | Postoffice. | County |
|---|---|---|
| H. C. & M. R. Elder | Darlington | Beaver |

## SHEEP.

### DORSETS.

| Name. | Postoffice. | County |
|---|---|---|
| F. C. Posler | Carlisle | Cumberland. |
| J.L.Henderson & Son, | Washington | Washington |
| Dr.W.L.McCleary, | Washington | Washington. |
| Henry Palmer | Avondale | Chester. |
| J. B. Wylie | Washington | Washington. |
| R. W McKee | Lewistown | Mifflin |

### SHROPSHIRES.

| | | |
|---|---|---|
| J. C. Rebout | Canonsburg | Washington |
| J. I. Barley | Baker's Summit | Bedford. |
| W. C. Black | Mercer | Mercer. |
| H. C. & M.R. Elder, | Cannelton | Beaver. |
| W. F. Gable | Wyebrooke | Chester |
| J. F. Lantz & Co. | Barneston | Chester. |
| W. A. Lothers | Lack | Juniata. |
| S. Shaffer | Princeton | Lawrence. |
| V. W. Johnston | Clymer | Tioga |

### LEICESTERS.

| | | |
|---|---|---|
| W. A. McCoy & Sons, | Mercer | Mercer. |

### LINCOLNS.

| | | |
|---|---|---|
| T. M. Shiveley | Mifflinburg | Union |
| Edward Walter | West Chester | Chester. |

### SOUTHDOWNS.

| | | |
|---|---|---|
| J. Grier Dain | Malvern | Chester. |
| W. A. McCoy & Sons, | Mercer | Mercer. |
| T. M. Crothers & Son, | Taylorstown | Washington |

### SPANISH MERINOS.

| | | |
|---|---|---|
| Jas. Lindsay & Sons | Utica | Venango |
| R. C. Vance | Burgettstown | Washington. |

### BLACKTOP SPANISH MERINOS.

| | | |
|---|---|---|
| John M. Berry | Wylandville | Washington. |
| Wm. Berry | Washington | Washington. |
| R. P. Berry | Washington | Washington. |

| | | |
|---|---|---|
| Dr. W. L. McCleary, | Washington | Washington. |
| R. L. Munce | Canonsburg | Washington. |
| J. D. Smith | Castile | Greene |
| R. W. Crothers & Son. | Taylorstown | Washington |

### DELAINE MERINOS.

| | | |
|---|---|---|
| E. B. Boyle | Canonsburg | Washington |
| Lee R. Scott | Burgettstown | Washington. |

### NATIONAL DELAINES.

| | | |
|---|---|---|
| J. B. Wylie | Washington | Washington. |
| R. W. Crothers & Son, | Taylorstown | Washingtown |

### OXFORDS.

| | | |
|---|---|---|
| E. M. Campbell | Leech's Corners | Mercer |
| A. G. Shaffer | Atwood | Armstrong |
| A. S. Worden | Ulysses | Potter. |

### HAMPSHIRES.

| | | |
|---|---|---|
| Jas. Blair | Espyville Station | Crawford |

### COTSWOLDS.

| | | |
|---|---|---|
| S.V.McDowell & Sons, | Fredonia | Mercer. |

### ANGORA GOATS.

| | | |
|---|---|---|
| Horace A. Field | Wellsboro | Tioga. |
| W. F. Gable | Wyebrooke | Chester |

## POULTRY.

### PLYMOUTH ROCKS.

| Name. | Postoffice. | County |
|---|---|---|
| N. O. Brownlee (B) | Claysville | Washington. |
| H. C. Bughman (W), | Pittsburg | Allegheny |
| Burns & Adams | Clinton | Allegheny |
| J. Grier Dain (B) | Malvern | Chester. |
| Eagley Bros (B & W), | N. Springfield | Erie |
| H.C.& M.R.Elder (B), | Cannelton | Beaver. |
| J. Wolf Evans (Buff), | Spring Mills | Center. |
| Geo. H. Fowler | Stoneboro | Mercer. |
| Wm. F. Gable (B. & W). | Altoona | Blair. |
| L. D. Harrington | North Water Gap | Monroe |
| Chas. W. Henry | Chestnut Hill | Philadelphia |
| W. F. Holtzer (B) | Greensburg | Westmoreland. |
| Edwin Johnson (B) | Dolington | Bucks |
| Theo. F. Jager, Exmoor Farms, | Lebanon | Lebanon |
| L. K. King | Westfield | Tioga |
| H. M. Lyon & Sons (B & W) | Spring Hill | Bradford |
| J. F. Lantz & Co, | Barneston | Chester |
| L. W. Lighty (B), | East Berlin | Adams. |
| W. F. McSparran (B) | Furniss | Lancaster |
| W.A.McCoy & Sons (W), | Mercer | Mercer. |
| Ezra Michener (W), | Michener | Bucks |
| W. J. Monroe (B) | Delmont | Westmoreland. |
| A. S. Morrow | Plumville | Indiana. |
| Pa. State College, | State College | Center. |
| Nelson Poorbaugh (B&W), | Mt. Pleasant, | Westm'l'd. |
| Ridge Farm (W), | Aldenville | Wayne. |
| R. F. Shannon (B) | Edgewort Station | Allegheny |
| M.P.Shoemaker & Bro.(W), | Greensburg, | Westm'l'd. |
| J. R. Truxall | Mutual | Westmoreland. |
| Thos. Turnbull, Jr. (B), | Monaca | Beaver. |
| A. P. Warren (B & Buff), | Elizabeth | Allegheny. |
| Shook Bros.(B & W) | Spring Mills | Center |
| T. M. McKee, [Barred]. | Lewistown | Mifflin |

### LEGHORNS.

| | | |
|---|---|---|
| Geo.S.Barnhart (Buff), | Greensburg | Westmoreland. |
| H.C.Bughman (S C W), | Pittsburg | Allegheny. |
| H. C. & M. R. Elder (B & W) | Darlington | Beaver |
| J.Wolf Evans (S C B & S C W), | Spring Mills, | Center. |
| Wm. F. Gable (W) | Altoona | Blair. |
| J. Wolfe Evans (W. & B) | Spring Mills | Center |
| L. D. Harrington | North Water Gap | Monroe |
| R. S. Hartley (B & Br) | Dugall | Warren |
| Theo. F. Jager, Exmoor Farms, | Lebanon | Lebanon |
| J.M.Main & Sons (S C W), | Shippensburg, | Cumb'l'd. |
| R. L. Munce (Br.) | Canonsburg | Washington |
| Shook Bros.(B.&W.) | Spring Mills | Center |
| Pa. State College (Br) | State College | Center. |
| Henry H. Phillips (W), | Pittsburg | Allegheny. |
| R. F. Shannon (B & W) | Edgeworth Sta. | Allegheny |
| W. L. & Geo. G. Strosnider (Br) | Cummins | Greene |
| M.P.Shoemaker & Bro (Br). | Greensburg. | Westm'l'd. |
| J. E. Woodmansee (W) | Lake Como | Wayne |
| A. P. Warren (Buff). | Elizabeth | Allegheny. |

### BANTAMS.

| | | |
|---|---|---|
| H. C. Bughman | Pittsburg | Allegheny |
| W. A. McCoy (Wh G) | Mercer | Mercer |
| R.F.Shannon (B B R Game). | Pittsburg | Allegheny. |
| Shook Bros | Spring Mills | Center |

### BRAHMAS.

| | | |
|---|---|---|
| B. E. Ferris (Lt) | Hector | Potter |
| Wm. F. Gable (Lt) | Wyebrooke | Chester |
| Penn'a State College (Lt) | State College | Center |
| R. F. Shannon (Lt. and Dark) | Edgeworth Station | Allegheny. |

### COCHINS.

| | | |
|---|---|---|
| W. F. Gable (Buff) | Wyebrooke | Chester |
| John M. Berry (W). | Wylandville | Washington. |
| Pa. State College (Lt). | State College | Center. |
| R.F.Shannon (Lt & Dk). | Edgeworth Sta. | Allegeheny. |

### MINORCAS.

| | | |
|---|---|---|
| R. S. Hartley | Dugall | Warren |
| Wm. F. Gable | Wyebrooke | Chester |
| Chas. W. Henry. | Chestnut Hill (Phila.). | Philadel. |
| Pa. State College (Blk) | State College | Center. |
| R.F.Shannon (Blk). | Edgeworth Station. | Allegeheny |
| Thos Turnbull, Jr. | Monaca | Beaver. |

### POLISH.

| | | |
|---|---|---|
| Penn'a State College | State College | Center |

### RHODE ISLAND REDS.

| | | |
|---|---|---|
| Chas. W. Henry | Chesnut Hill | Philadelphia |
| Penn'a State College | State College | Center |
| Miller Bros | Stonybrook | York |

### WHITE WONDERS.

| | | |
|---|---|---|
| T. M. Shiveley | Mifflinburg | Union |

### GAMES.

| | | |
|---|---|---|
| Pa. State College | State College | Center. |
| Henry M. Philips (B B). | Pittsburlg | Allegheny. |

### FAVEROLLES.

| | | |
|---|---|---|
| Pa. State College | State College | Center. |

### WYANDOTTES.

| | | |
|---|---|---|
| T. E. Orr (Silver, Partridge & Wh). | Beaver | Beaver |
| Penn'a State College | State College | Center |
| Theo. F. Jager, Exmoor Farms, | Lebanon | Lebanon |
| L. D. Harrington | North Water Gap | Monroe |
| Bayard Bros. (Wh), | Waynesburg | Greene. |
| Wm. F. Gable (Buff) | Wyebrooke | Chester |
| Julius LeMoyne (Wh). | Washington | Washington. |
| Chas. C. Townsend (5 var.). | Westchester. | Chester. |
| Ezra Michener | Michener | Bucks |
| Shook Bro.(W&Sil) | Spring Mills | Center |
| F. E. Traver, [Buff] | Wyebrook | Chester |
| R. W. Crothers & Son, | Taylorstown | Washington |

### HAMBURGS.

| | | |
|---|---|---|
| Shook Bros | Spring Mills | Center |

### BUFF ORPINGTONS.

| | | |
|---|---|---|
| T. E. Orr | Beaver | Beaver |
| W. A. McCoy & Sons. | Mercer | Mercer. |
| R. F. Shannon. | Edgworth Station | Allegheny. |

### TURKEYS.

| | | |
|---|---|---|
| H. C. & M. R. Elder (Br). | Darlington | Beaver |
| T. M. Shively (W. Hol.) | Mifflinburg | Union |

| | | |
|---|---|---|
| B. L. Post & Sons (M B) | Claysville | Washington |
| Theo. F. Jager, Exmoor Farms, | Lebanon | Lebanon |
| John M. Berry (W Hol), | Wylandville, | Washington. |
| W.A.McCoy & Sons (W. Hol), | Mercer | Mercer. |
| J. L. McGough (Buff) | Dinsmore | Washington |
| A. G. Shaffer | Atwood | Armstrong. |
| J. R. Truxal | Mutual | Westmoreland. |
| L. K. King, [W. Hol.] | Westfield | Tiago |
| R.W.Crothers & Son,[W. H.] | Taylorstown, | Washington |

### DUCKS.

| | | |
|---|---|---|
| Edwin Johnson (Pekin) | Dolington | Bucks |
| Theo. F. Jager. Exmoor Farms, | Lebanon | Lebanon |
| W.A.McCoy & Sons (Pekin), | Mercer | Mercer. |
| J F. Lantz & Co.(Pekin | Barneston | Chester |
| Shook Bros.(P. & R.) | Spring Mills | Center |

### GUINEAS.

| | | |
|---|---|---|
| W.A.McCoy & Sons (Wh), | Mercer | Mercer. |

### GEESE.

| | | |
|---|---|---|
| Theo. F. Jager, Exmoor Farms, | Lebanon | Lebanon |
| W. A. McCoy & Sons (W. Chi), | Mercer | Mercer. |
| Shook Bros. [W. Chi] | Spring Mills | Center |

### PEAFOWLS.

| | | |
|---|---|---|
| W. A. McCoy & Sons | Mercer | Mercer. |

### PIGEONS.

| | | |
|---|---|---|
| W. A. McCoy & Sons (W Fan), | Mercer | Mercer. |

## PETS.

### BELGIAN HARES.

| Name. | Postoffice. | County |
|---|---|---|
| H. C. Bughman | Pittsburg | Allegheny. |
| Eagley Bros. | North Springfield | Erie. |
| W. J. Monroe | Delmont | Westmoreland. |

### DOGS.

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Chestnut Hill (Phila.), Philadelphia.

| Name. | Postoffice. | County |
|---|---|---|
| J. F. Lantz & Co. (Beagles) | Barneston | Chester |
| J. M. Main & Sons (Irish Sett's) | Shippensburg | Cum |
| T. M. McKee, [Collies], | Lewistown | Mifflin |
| Thos. Turnbull, Jr., (Bull Terriers) | Allegheny. | All'y |

### COLLIES.

| | | |
|---|---|---|
| J. Grier Dain | Malvern | Chester. |
| Theo. F. Jager, Exmoor Farms, | Lebanon | Lebanon |
| T. E. Orr | Beaver | Beaver. |
| H. M. Lyon & Sons | Spring Hill | Bradford |
| B. L. Post & Sons | Claysville | Washington |
| D. L.Stevens | Elkdale | Susquehanna. |
| Edward Walter | West Chester | Chester. |

### AIRESDALE TERRIERS.

| | | |
|---|---|---|
| R. F. Shannon | Edgeworth Station | Allegheny. |

### FERRETS.

| | | |
|---|---|---|
| B. L. Post & Sons | Claysville | Washington |

## MEMBERS WHOSE STOCK IS NOT REPORTED.

| Name. | Postoffice. | County |
|---|---|---|
| Dr. H. P. Armsby | State College | Center |
| S. W. Berry | Canonsburg | Washington |
| Geo. M. Earnest | Greensburg | Westmoreland |
| Dillon Gibbons | Yohoghany | Westmoreland |
| Prof. John Hamilton. | Harrisburg | Dauphin |
| S. S. Hutchison | Warriorsmark | Huntingdon |
| J. M. Hustead | Uniontown | Fayette |
| T. D. Harman | Pittsburg | Allegheny |
| James Meloney | McDonald | Washington |
| L. L. Pope | Cleveland. Ohio | |
| Chas. A. Porter, | Torresdale.[Philadelphia], | Philadelphia |
| W. C. Patterson | State College | Center |
| Dr. Leonard Pearson, | Philadelphia | Philadelphia |
| Henry H. Randt | Pipersville | Bucks |
| A. R. Van Tassel | Dubois | Clearfield |
| Prof. G. C. Watson, | State College | Center |
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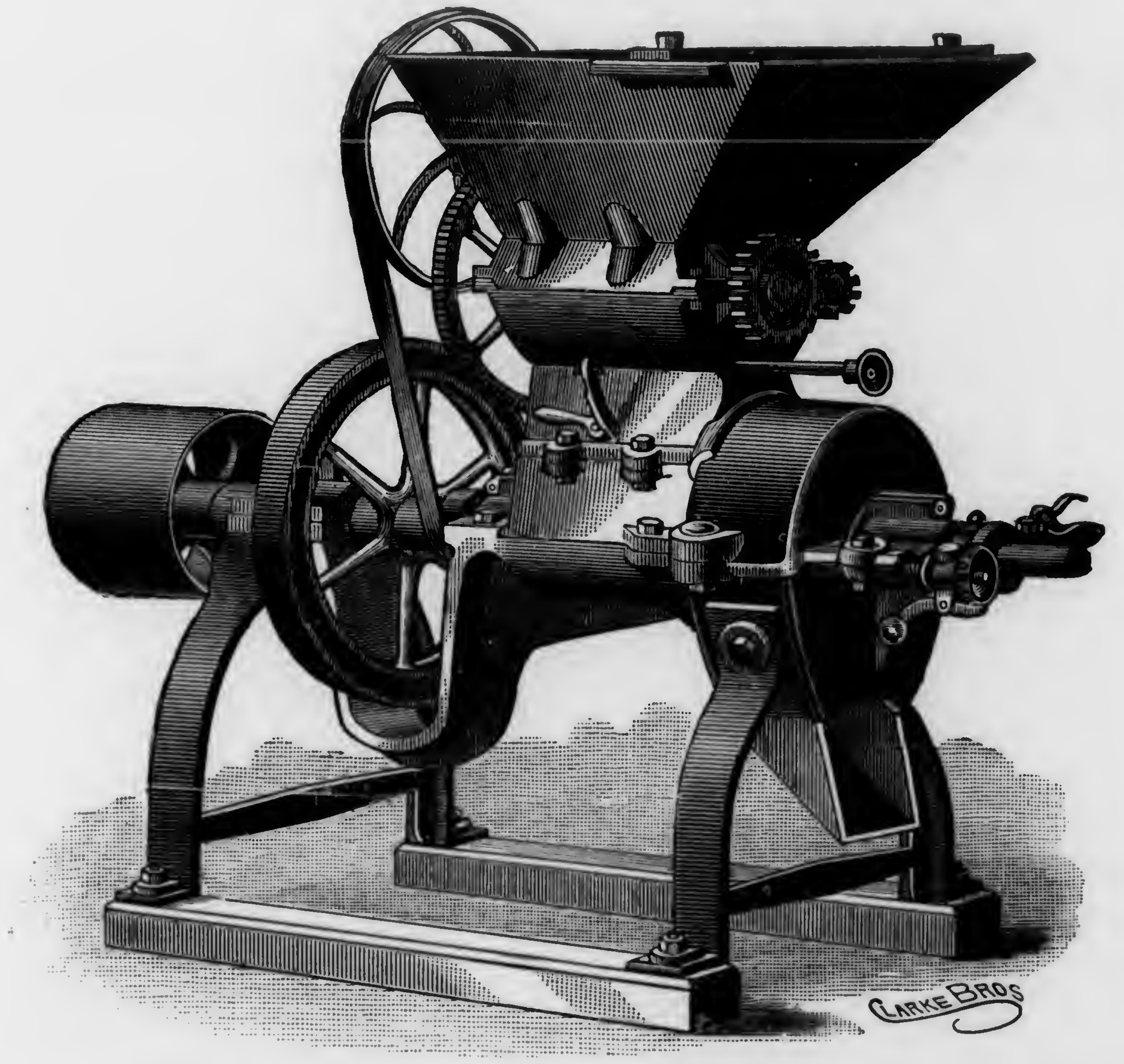

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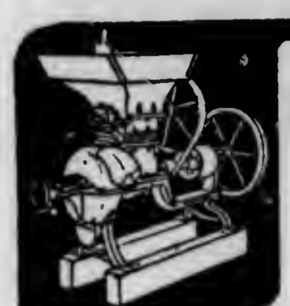

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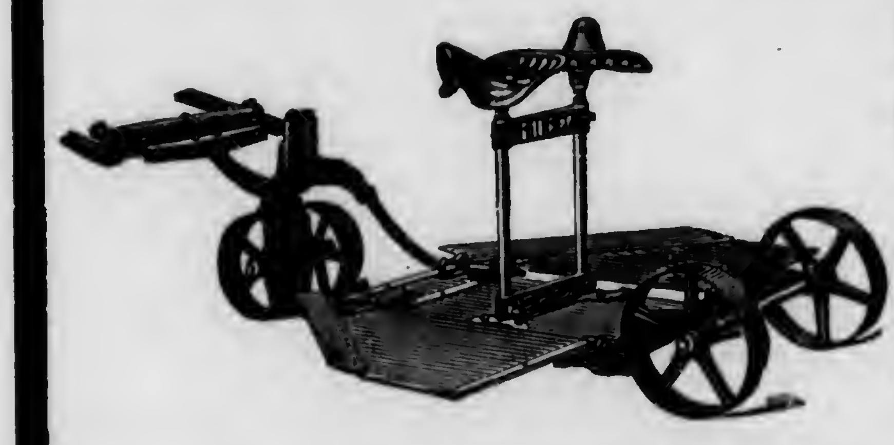

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Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1904

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1904

Master Negative Storage Number: MNS# PSt SNPaAg057.3

1904

BULLETIN NO. 10, OF

THE PENNSYLVANIA STATE COLLEGE
AGRICULTURAL EXPERIMENT STATION.
STATE COLLEGE, CENTRE CO., PA.

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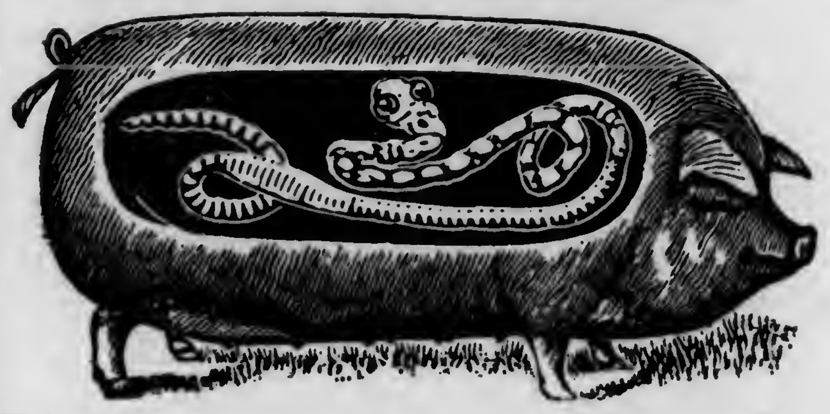

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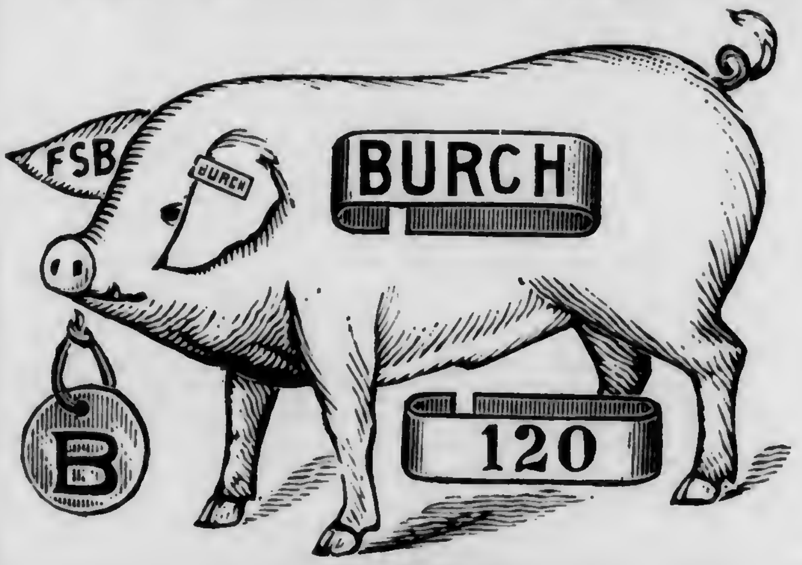

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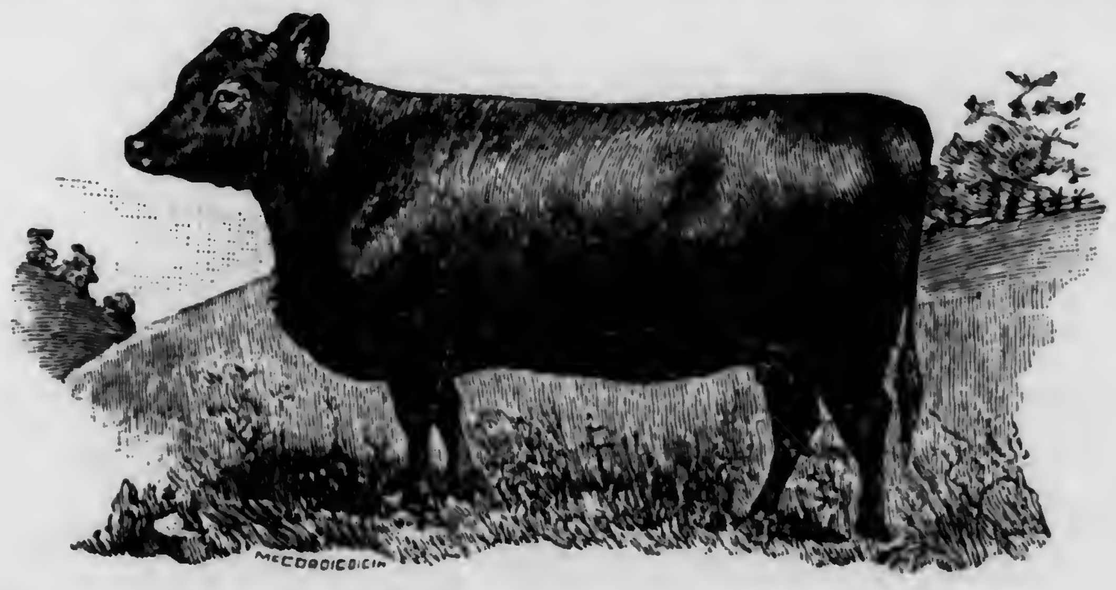

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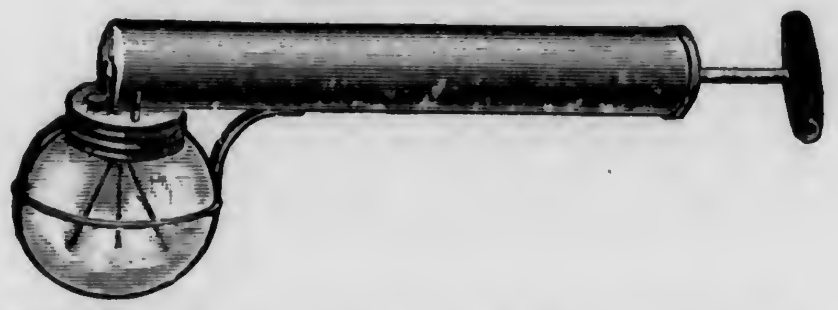

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**J. F. LANTZ.** **J. IRWIN LANTZ.**

# WATERSIDE FLOCK OF SHROPSHIRE SHEEP

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Breeders and Importers of **Shropshire Sheep.**

BREEDERS OF
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**The famous flock of Waterside Shropshires founded in 1888. All stock recorded. Waterside Shropshires can be traced through the records to the oldest and purest flocks in the world; many of them being direct descendants of the most noted English prize winners.**

Colfax, Pa., March 7th, 1904.

MR. J. F. LANTZ, Glenmoore, Pa.

Dear Sir: The Jersey calf is doing finely. I see no reason why he will not get along, all are pleased with him, and I am sure I do not see where you said anything about him which he does not justify. His color and markings are perfect as far as I can see, his length and height would indicate that he will have good size too. If he developes into what he promises now, I will not regret putting the money into him. He is the finest calf brought in here that I have seen. He reached us in good shape, and am much obliged for putting him up in good shape, and for your interest in sending him to us.

Very Truly Yours,
E. S. CHILCOTT.

**Waterside flock is the oldest line bred flock of wool-mutton Shropshires in Pennsylvania. Every ewe is sired by the highest class imported rams that money can buy. If you are looking for cheap sheep, don't write us, write the other fellow; but if you want the best, please write us early in the season, and we will quote as low a price as is consistent with the quality of stock offered.**

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**GLENMOORE, - - PENN'A.**

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and Chester White Hogs.

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White Holland Turkeys,
White China Geese, Pekin Ducks,
White Plymouth Rocks
and Buff Orpington Chickens.
Peafowl, White Guineas, Fantail Pigeons.

**Glen Gable Stock Farm,**
Wyebrooke, Chester County, Pa.

GUERNSEY CATTLE,
SHROPSHIRE SHEEP,
CHESTER WHITE PIGS,
BUFF WYANDOTTE POULTRY.

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# PROCEEDINGS AND PAPERS

OF

# FIFTH ANNUAL MEETING

OF

# The Pennsylvania Live Stock Breeders' . . . Association

HELD AT

Pittsburg, February 10 and 11, 1904.

## OFFICERS:

President..................................W. C. NORTON, Aldenville
First Vice-President.....DR. LEONARD PEARSON, Harrisburg
Second Vice-President..........M. P. SHOEMAKER, Greensburg
Secretary..........................E. S. BAYARD, East End, Pittsburg
Treasurer......................................J. F. LANTZ, Glenmoore

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# THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

## Fifth Annual Meeting

PITTSBURG, PA.
February 10th and 11th, 1904

## PREFACE

I regret to announce that the annual report is somewhat incomplete, owing to the inability of the stenographer to keep pace with the speakers at our late meeting. One of Mr. Detrich's addresses had to be omitted; and I find that no stenographer has yet been found who is able to keep up with this speaker. In several cases the discussions have been abridged because the stenographer was unable to furnish the full report. But there remains very much of value, and the report should have a wide circulation in Pennsylvania. Requests for it have been received from several other states.

Our list of stock may not be complete because many members have not responded to requests made for information. It is impossible for me to keep old correspondence from which to make this list. I have not time to refer to it. Any errors in list will be gladly corrected at next publication.

Our advertisers have made it possible for us to publish and distribute this report and we commend them to the patronage of those who read it. Extra copies of this and our previous report may be had by addressing the undersigned.

E. S. Bayard,
201 Shady Ave., E. E., Pittsburg, Pa.

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Gentlemen: I am glad to see so many of you here. We have a good program and from what I have seen and heard already I feel sure that this will be the best meeting we have ever had. I don't believe in long speeches from the chair, and will ask you to excuse me. We will hear the reports of our officers—and here let me say that these officers have done a great deal of hard work for this association and the cause which it represents. The report of the treasurer is in order.

Mr. Lantz: I have a report in detail which I can read, or I can give you the summary, leaving the rest to the auditors.

The President: The summary will be sufficient.

Mr. Lantz then read the following:

### RECAPITULATION.

#### Receipts.

| | | |
|---|---|---|
| Balance on hand December 11th, 1902 | $ 18.70 | |
| Dues and membership fees, collected since last meeting | 24.00 | |
| Appropriation from State Board of Agriculture | 108.00 | |
| Advertisements in bulletin No. 9 | 107.00 | $257.70 |

#### Expenditures.

| | | |
|---|---|---|
| Expense of lecturers, at Fourth annual meeting | $ 69.95 | |
| Hall rent, at Fourth annual meeting | 12.50 | |
| Treasurer's bill for postage, soliciting ads, etc. | 17.87 | |
| Stenographic report of Fourth annual meeting | 20.00 | |
| Publication of bulletin No. 9 | 133.45 | $253.77 |
| Balance cash on hand | | $ 3.93 |

I have on former occasions called your attention to the fact that the annual dues were not sufficient to meet the necessary expenses of our association. It is true we did manage to get out the report of the last annual meeting in bulletin No. 9, but no one except your worthy secretary E. S. Bayard and myself know how we had to reduce every item to the lowest possible cost in order to pay for the same.

You have all received a copy of this report and you must be the judge as to whether such reports are of advantage to our Association and the Live Stock interests of Pennsylvania. If they are it remains for you to devise the ways and means to raise the money to pay for the forthcoming issue.

If we want to get the best results from such a report, we should issue 5,000 copies, in order that it may circulate among the best breeders of other States as well as those of Pennsylvania.

Any of you who wish to place advertisements in the forthcoming report, should place your order for the amount of space wanted with the Secretary, before this meeting adjourns, this would save correspondence which costs both time and money. If any of you or your friends have anything to bequeath to the live stock interests of Pennsylvania the same will be gratefully accepted by this Association, and we will assure you that every cent will be carefully devoted to the advancement of this important industry. J. F. Lantz, Treas.

The President: We will now have the report of the Secretary.

Mr. Bayard: I refer you to the published report, Bulletin No. 9. A number of copies of this report are left and will be sent to any one who wants them.

The President: We must move on if we are to get the benefit of an address before noon. I want to introduce a man who has earned the title of the best farmer in the state, Rev. J. D. Detrich, of Montgomery county—and he is going to talk to us about soils.

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# SOIL BACTERIA

## ADDRESS OF REV. J. D. DETRICH, FLOURTOWN.

Mr. President and Members of the Pennsylvania Live Stock Breeders' Association:

It it generally known that at Flourtown we raise Jerseys and crops, but I have something very interesting for this breeders' association this morning. We have found out about raising bacteria. The bacteria which have been found at Flourtown have caused such an interest to spring up that it is really our conversation when we meet. Now to talk about the bacteria found on the farm at Flourtown—the farm that has been talked about so much during the last few years. Scientific men have come to the farm, professors and presidents of colleges. This season as high as twenty-five gentlemen visited the farm in one day. This shows the intense interest that is being taken in agriculture and the crops which have been raised at Flourtown.

It was a very great satisfaction to me when I found out that the scientific men were coming to analyze this soil to find out exactly what was the cause of these marvelous crops. You all know that the farm has been under my care for the last twenty or twenty-one years, and it has been conducted on a scientific basis.

The result this season we are very glad to tell you about, for it looks as though we have found the keynote of restoring the worn out farms of the eastern part of the United States. And while there are people who have talked about manure and fertilizer and have talked about cultivation, it seems that there are many things that we have not found out that are the real cause of producing the crops, and it is simply that where bacteria are plentiful in the soil that you get the largest crops. Of course, cultivation cannot be excluded, humus is indispensable, plant food is necessary, but there must always be a factor that will utilize these elements in order to grow the crop. Science today has almost proven conclusively that the real cause of plant growth—the principle of plant growth—is the bacteria of the soil. There is something remarkable about it. Twenty years ago medical science first started out on bacteria, and they found that these bacteria were the cause of many of our diseases. Every one believed that the bacteria were all injurious as though when they found bacteria they had found some poisonous element of life that was continually destroying human life and animal life, but we find bacteria are valuable as well as injurious.

### Bacterial Life.

The scientific men came there and took specimens back to their laboratories and invited me later to a little exhibit of what they found at Flourtown, and showed me the soil, the depth of it, and told me that the largest number of bacteria ever found in one-thirtieth of a cubic inch, previous to examining this, was five million, but in this they found twenty million. Now this fact is set before us that there is humus where we grow these crops, and there are the bacteria in such immense numbers that these crops are so easily and readily grown. And we have the scientific explanation of it as well as the practical results. Now while there are different kinds of bacteria—bacteria disease, bacteria ferment, and bacteria that we call soil bacteria—we find that these very bacteria seem to have different degrees of usefulness; for instance, the kind of bacteria that attack the human body and produce disease live in a temperature exactly as the person or the animal that they attack does. It is astonishing about these things, but it is no less interesting to us in studying to find that these different kinds of bacteria have their offices and work, and that the bacteria of the soil can almost live in boiling water. That is surprising to us. The bacteria of the air can live in almost freezing temperature, and so you see that they have their different spheres in which to work, and they seem to be in the whole plan of life today. Now that we have learned so much about the bacteria, that is, that wherever they are present in the soil in the immense numbers that we have called soil bacteria, just as disease bacteria and bacteria ferment, scientists tell us that they have found about twelve hundred different kinds of bacteria and that they are found about the whole foundation of life. For instance, just as soon as an animal dies or a plant dies, the bacteria immediately commence to attack that plant or the dead animal and disintegrate it and return it in its elements either to the soil or to the atmosphere, and these component parts can supply the life and life makes its cycle. If it were for these bacteria the whole world would soon be covered with mummies. But since these bacteria are so particularly active in disintegrating animal life and vegetable life and returning it again to its similar elements we have life perpetuated.

### A Warm Soil.

Now we have some most practical examples at Flourtown. For instance, two years ago we turned a piece of ground around in order to plant corn. I had been very careful in observing every phase of the growing of the crop, the work of the harrows, the work of the plows upon every individual plant, and every action of manure and every condition of the soil, whether of rain or sunshine. We turned this field around and there was an immense amount of humus turned under. It was in splendid condition. The next day after the planting of this field in corn there was a perfect vapor rising up off that field of corn. I was examining it very closely and I found the rain, which had fallen the day before, had made a light crust over the soil. But here was this immense heat hissing up. I went up and put my hand on the ground. It didn't seem so very warm. The sun was exceedingly warm the day following the rain. I wondered where this heat came from. I simply put my finger down in the ground deeper and deeper, and it was a complete hotbed in there, and I tell you in four days the corn came right up in that ground and never stopped growing, and in six weeks I was standing upon the hill, with five persons, looking down upon the man cultivating that corn—and the horse was sixteen hands high—and all that I could see of that horse and man in that corn after six weeks' planting was the horse's ears moving through the corn. This proves conclusively to me, from what I know of that corn and from what I have learned this summer, that the bacteria were acting intensely in the soil and that the immense amount of heat which was generated there was most favorable for their living and activity. And we have their work which they have done there—it was simply enormous. Like a certain scientist when he took off his hat to a piece of ground. As he took the soil and saw it sift through his hands, he says "That is the most marvelous soil I have ever put my hand into. We talk about the operatives in factories, and the insect life in air, and the bird life and the animal life; it is nothing compared to the billions of bacterial life there in that particular soil, working it up for plant food and enriching and utilizing all those elements which are in the soil and turning it over and over for the purpose of growing the crop. That is a delightful scene: my eyes have never fallen upon any scene like this which is in my hand today—this little handful of soil." These are as closing words of the scientific man as nearly as I can possibly quote them at the present time.

Now when we speak of these bacteria and their activity in the soil and their usefulness in the soil, it shows conclusively that wherever bacteria are in large quantities the crops are proportionately large, and wherever bacteria are deficient there are the crops proportionately smaller.

### Humus.

Now take humus, which is so valuable and about which we have read so much; these two go together. As a rule, wherever humus is plentiful there is also more bacteria. It is like when I said a moment ago: just as soon as a plant dies the bacteria immediately commence disintegrating it and assigning the elements in the plant to the air or to the earth. It then becomes plant food. That is the way the plant lives, and as long as we know these things we are getting into the very secret laws of nature.

When we found at Flourtown as large a quantity of bacteria as we have just explained, and how they live in different temperatures, we then come to the subject of how they breed. These bacteria are so highly active that if they are in a favorable temperature and favorable soil, such as that corn field, they multiply with exceeding rapidity. These scientific men tell us they breed every twenty minutes; they breed simply by the division of a cell. If you take bacteria and put them end to end, it would take ten thousand to make an inch in length; for a person to see bacteria with the naked eyer it would require a colony of fifteen hundred thousand.

When we talk about soil we speak of rich soil and poor soil.

A noted German professor says that the soil hasn't anything to do actually with growing plants. He had some large glass cases and placed water in them; he added just so much plant food daily to this water and dropped the seeds into it. He has trees that have never been in the earth at all, just started in the water and had the plant food placed in there and he has trees that measure ten inches in diameter. This forever sweeps out the idea that there is anything in the soil of itself. What we want today is plant food. And what we have put into the soil in Flourtown has been the very best plant food and the best humus we could possibly procure. The earth is a complete laboratory. No woman can bake a pie of loaf of bread without a chemical action taking place in the baking, and the same thing is true in raising plants on the farm—that the farm today is a great laboratory in which you place this food and the bacteria are the functions which work it up so that the plant can live upon it. While these trees of the professor were standing in the water they had to be supported by wires. You could see every root and every part of them. They grew upon the food that was placed in the water. Now what is the hope of the eastern farmers? When we look about us today and see the worn out farms of Pennsylvania, we speak about the soil being worn out, that there is nothing there upon which the plants could grow. Now the question is, how can we put these bacteria into the soil? The professor makes another great discovery. He says that these bacteria are a great deal like people, that just as people get rich and won't work so we find the bacteria when they are fed. In our farm at Flourtown we do not depend upon the almanac and the signs and all those out-of-date methods, but we use the microscope and make a chemical analysis, and thus know positively what we are doing and going to do.

I believe now, gentlemen, there is a discussion to follow, and I will answer to the best of my ability any questions which you may put to me.

### Discussion.

Question: You spoke about inoculating poor soil with these yeast cake bacteria and found it worked better in poor soil than in the better soil?

Answer: That is right. Of course, these bacteria must be fed. You will find that they work harder when they are not fully supplied with food; that is to say, they make greater efforts to perptuate themselves when they are not well supplied with food; but they, of course, multiply faster when their food is plentiful. When we say they work harder we simply mean they make greater efforts, not that there are more of them.

Q. What time was the corn field planted that you spoke about, doctor?

A. On the 17th of June. Everything was favorable. The ground was in perfect condition.

Q. Are the bacteria in commercial fertilizer, and if not, where is their benefit?

A. We have never used fertilizer at all.

Adjourned until 1:30 o'clock P. M.

## AFTERNOON SESSION.

The President: Gentlemen, we have here to-day a man who has made his mark with sheep in more than one country, who has raised, fitted and shown sheep successfully and judged them at our great shows to the satisfaction of other breeders. I introduce with much pleasure Mr. J. C. Duncan, of Lewiston, N. Y., and he requests me to say that you are at liberty to interrupt him with questions at any point in his talk:

# MANAGEMENT OF THE BREEDING FLOCK

### ADDRESS BY J. C. DUNCAN, LEWISTON, NEW YORK.

Mr. President and Gentlemen of the Pennsylvania Live Stock Breeders' Association:

I do not know that I can address you in the same manner as Dr. Detrich did this morning, but I will be glad to give you my experience of about twenty-five years in the sheep industry. In New York State we find the same trouble that you have in Pennsylvania to get our breeders to take an active interest in our meetings. We all leave it to the officers of the association to do all the work, but we can never make a live stock breeders' association a success if we do not take hold and help these officers in their work. They are located in one place and you are located all through the country, and if you will only take an individual interest and each one talk up this matter to his neighbors, I have no doubt that in the future you can get a live stock association in the State of Pennsylvania that will be second to none in any state in the Union. Gentlemen, I would like to congratulate you upon your secretary. That is one great trouble we have in the State of New York with our breeders' association; we can get men that can keep a regular minute book and all that sort of thing and take in the dues, but it is so hard to get a man that is strictly the right man in the right place. I believe, gentlemen, in your secretary you have the right man in the right place, if you will only give him your co-operation. (Applause.)

I will begin at this point of the year (February) and follow the flock right around until we land here again. At this season of the year most of the pure-bred flocks are commencing to drop lambs. Now we have to give these things a little attention, just the same as a business man does. He doesn't wait until the month of April before he purchases his spring goods. If he did, he would not get much trade. Just the same way with our lambs, if we do not make preparation for them we cannot expect to save them and develop them in order to make them what we want them to be. It was my custom years ago, when I first came to this country, to have my lambs dropped in the regular sheep barn, but I found out from experience that that did not work very well, because in order to have the barn warm enough for these young lambs I have to keep them confined too closely for the health of the flock in general. Of late years it has been my habit to remove the ewes the day previous to lambing to another part of the barn where it is kept much warmer. The ewe is kept there until she lambs and probably three or four days after. By that time she and her lambs are acquainted and ready to go back into the flock again.

### Close Housing Injurious.

My sheep barn has never been closed this winter, that is, the main sheep barn. I find from experience that there is nothing more detrimental to the health of a flock of sheep than a close, confined, steamy barn. That was my reason for removing the ewes to a warmer place where there wouldn't be so many of them confined as to make it a close and damp atmosphere. When the ewes are dropping lambs the ration at this time of the year should be as little as possible, because the ewe is in a feverish condition, and the less food she has at this time the quicker she will come around to her natural condition again; so I feed her for the first three or four days just as easily digested food as I can procure for her,—pulped roots, pea vine hay or alfalfa.

Now when these lambs commence to grow the next thing is to give them some little attention. When they are about ten days old I generally have their tails all docked and have their ear tags put in. I used to think anybody could cut a lamb's tail off, but I find that is a mistake. He can if he knows how. Some people chop it off with an axe; some use docking pincers; another fellow cuts them off with a knife. There is nothing more aggravating to a breeder or showman when he comes to trim up a fancy sheep to find the docks about three inches long. It just spoils the whole thing. You cannot make a nice shape. It is absolutely necessary to have those tails all cut the same length. My plan in cutting those tails off is I have an assistant who takes the lamb, puts his hand under the jaw, and then he takes the other hand and puts one finger under the tail, and I generally cut the tail off. Now, when I get through every one of those lambs' tails will be exactly the same length. I think that is a great help to a person when you come to trim up your lambs to have them look nice.

### Feed for Lambs.

When they are about three weeks old, in order to develop them, they want to be provided with something else besides the nourishment from the ewe. It is astonishing how quickly those young things will learn to eat. I was standing in the sheep barn the other day, and there was a lamb just exactly thirteen days old came up to a pail of water and started to drink. I have been around sheep all my life, but I never saw as young a lamb as that take a drink of water. When they get three weeks old if you provide for them a creep and put in some bran and a little oil meal they soon learn to eat it, and by the time they are five weeks old they will eat ground oats, bran and oil cake, pea vine, and that helps to take the strain off the ewe. It reduces the ewe very much to have big lambs pulling away at her if there is no extra feed coming. This one point I find is a great help in developing those young lambs. After the lambs get to be five weeks old, I change their feed from bran and oil meal. I put in grain, so that the feed will consist probably of two-thirds oats and the other third will be bran and oil meal mixed together. As soon as they get old enough, so that they can eat the oil cake, I substitute that for the oil meal, because they do not like the meal, as a rule. It sticks upon their noses and they do not like anything sticking around their noses. I never feed any corn. I do not think it is good for a young lamb. Another point in the management of the flock, after you have gotten those lambs so they are eating well and the ewe doing well, the barns should be kept clean. I have gone into sheep barns were there was a lot of mud and they had a big straw stack standing out in the rain, making it into manure. I do not like anything like that to go on around my place where I have any sheep. I would rather have it put in amongst the sheep and see they are kept there to make it into good manure and have it hauled out.

### The Ewes' Rations.

Those ewes want to be fed very generously just as soon as they get on to a full diet again after lambing. I have as large a feed variety as it is possible. I find they do much better than if fed exclusively on one kind of feed. I usually feed twice a day; feed roots at noon, with all the clover and alfalfa hay they want to eat, without waste. I generally calculate to give enough to waste a little. I throw that into the horses. They are very fond of it and it reduces the waste on the sheep farm to a minimum. We ought not to have very much trouble with the flock again until we come to turn to pasture. That is another time that requires considerable care, because there is no season of the year that the ewe will run down faster than if you turn her out to a lot of immature pasture grass. I always carry on my regular winter ration for probably three weeks after I turn them out, and reduce it gradually, because I find if I take it away immediately I am apt to have lots of trouble. It is not much work to drive the sheep out and into the barn for at least two weeks, and a person would get along and avoid lots of trouble.

Question. What kind of corn do you use?

Answer. I have not fed a bit of corn all winter until they began to drop lambs. I give them some pulped roots and a little bran and keep on gradually until I get them on a full feed. I generally use a mixture of different grains, oats and corn, bran and some oil cake, and I find it to be as good feed I can give the ewes to produce milk.

Q. Do you feed that all the while?

A. Some corn silage and clover hay and alfalfa makes a very good ration for breeding ewes.

### Turning to Pasture.

Now, after we turn to pasture. Sometimes we shear before we turn and sometimes after. I generally try to have them all sheared before I turn them out to pasture, because if you let a flock of ewes go to pasture without shearing they are apt to get dirty, and it is a lot of trouble to clean the fleece. If you roll it all up together, then the man who buys your wool will not come back next year.

Q. Do you wash your sheep?

A. I never believed it was profitable to turn my sheep into a river to wash them.

Q. Don't you shear any of your sheep until about the time you turn on grass?

A. We usually shear our show sheep a little earlier than that, but it is the average breeding flock I am speaking about just now. Our show sheep are shorn a little earlier than that.

Q. What dip do you use?

A. I use the Cooper sheep dip.

Q. What do you dip for?

A. Dip to destroy ticks and parasites and to improve the condition of the wool.

Q. Have you had any trouble from lamb cholera about the time the flock is changing from stable to pasture?

A. No.

Q. What kind of grass do you grow?

A. Almost every kind that is good.

### The Stomach Worm.

Now one of the troubles we have had up where I live is with the stomach worm in our lambs. It has caused us a great deal of work and caused a great many people to go out of the sheep business. As a precaution, about the first of July, I dose all my lambs with gasoline. I have done that now only for three years,—just the same as I dip them. It might not be necessary to do it, but I know I had some trouble. I tried all those worm powders. I didn't get satisfaction out of them. I tried this gasoline treatment and I have been very successful. I think if our sheep owners will adopt this gasoline treatment along in the summer for their lambs and give them, say, two treatments of it, they will not go out of the sheep business. I know this from experience. We kill lambs up there on our place generally two a week, and I have a very good chance to examine them and see what the trouble is, and I have killed those lambs and found the intestinal worms there by the thousands in the fourth stomach of the lamb. I believe the gasoline treatment is the only thing that will remedy those worms.

Q. Is it not a fact that the stomach worms are now lessening?

A. Some seasons they are bad and others not. I do not believe a man can afford to take the chances for the sake of taking that view. I can take and dose those lambs about two a minute. I am going to take that precaution in the future with my pure-bred lambs. I have never taken that precaution with the commercial sheep, because we generally don't keep them so long anyway. We have not had the trouble with them that we have had with the pure-bred sheep.

Q. What is a dose of gasoline?

A. I use just a tablespoonful of gasoline in about a quarter of a pint of milk. Some advocate the use of raw oil, but I have never used raw oil along with gasoline. I have used the milk and have had good success. It might still be better to use the oil, but I have never done it that way.

Q. Raw linseed oil?

A. Yes.

Q. Do you ever try drenching the ewes before the lambs come for the stomach worm?

A. No, I have never tried that.

Q. Please describe your method of administering the gasoline to lambs.

A. One man catches the lamb, another man fixes the medicine, putting it into a bottle; I take the lamb and set on its rump, my knees against his back; I put my index finger right in the mouth, the thumb over the nose, and I keep the head straight, so there is no chance to strangle. Place the bottle to the roof of the mouth and pour the stuff in.

Q. How do you mix the medicine?

A. I put the gasoline in the bottle. We have a funnel that we put it in there with. We measure it with a spoon; we take a quarter of a pint of milk and pour it through the funnel, and shake it for probably two or three seconds, and pour it right down.

### At Weaning Time.

Now when we wean those lambs I generally have a field of clover, and if rape is added it is so much better. After weaning we usually begin to feed the lambs a little grain from that right along until fall. We put the ewes for the first week or ten days right onto the poorest pasture we have, so as to reduce the flow of the milk. And sometimes I turn the lambs in. I have done it different ways; some years I do not; depends upon how the ewes' udders look. If they are full I turn the lambs in to nurse them out, and if the lambs happen to be a little older and the ewes do not have the flow of milk, we do not turn them in at all. We do this in order to avoid any danger of spoiling the udders.

After the ewes are dried up and we want to get them to come in early we find it is advantageous to turn them on to a rather rich pasture and also feed a little grain at that season of the year. We find we can help the ewes a little if we let them run in a rather good pasture. There is nothing looks nicer than to have the flocks all looking symmetrical; for when a man comes to look at them with the expectation of buying, if they are a little ragged-looking, he is likely to go some place else to invest his money. I find the nicer and the more symmetrical we can keep those flocks the more financial gain we get out of them.

We come now to the mating season in the fall. I used to take a great deal of pains that way; turn my rams out to the ewes and just let them serve once or twice. When I have fifty or sixty ewes I generally use about two or three rams, and I select the ewes and turn the rams with them at nights. I find I have just as good success with a great deal less amount of trouble than I used to take in being more particular about the mating of those ewes.

I do not believe it is good for the health of the flock to feed much corn during the winter, because if you can keep your ewes in a good, healthy condition without grain you won't have the trouble when they drop lambs that you will if you are feeding corn,—no caked udders, because the animal system gets all heated up; and I find there is nothing better than clover hay and alfalfa and some roots to keep the sheep in healthy growing condition.

Q. Do you feed your alfalfa green?

A. Feed it green to my show sheep during a dry season.

### The Grade Flock.

Now a word about the commercial flock. In our commercial flock we find that to be one of the most profitable things that we raise on the farm. We bought two run-down farms about two years ago, containing about two hundred and seventy-five acres, and we put about one hundred and eighty ewes, and we have two hundred and seventy-eight lambs, and the first car-load we sold for five dollars apiece and the last that we sold here about two weeks ago we got $779 back for

them. The last bunch averaged $5.80 apiece. Now these were just grown for commercial purposes on run-down farms and all that it cost us to raise those lambs was one man, and he did a lot of outside work besides, and this last car-load did not eat over five pounds of corn per head—everything else they picked up off the farm. So I do not think there is any more profitable line of business on the farm than raising sheep when you consider the amount of care that they need in comparison with other animals. That is one great detriment to the live stock interest in this country at present—to get the right man to take care of the stock. It is almost impossible. But the sheep is an animal that will take care of itself eight months out of the year at least, if you will only provide the stuff so she can eat it.

Q. What do you do with the dogs?

A. I pay my shepherds on these run-down farms two dollars a head for every dog they kill.

Another point in the commercial flock—I cannot see why more people don't go into it. Take, for instance, those Canadians, I find in conversation with them that they tell me there is nothing that grows on their farms that they can make more clear money out of than sheep. Now, they have to bring them over to Buffalo. They pay their expenses and pay a duty of seventy-five cents per head on every animal they bring to the Buffalo market, and then they tell me, notwithstanding all that, there is nothing on their farms that gives them so much clear money as the sheep.

Q. How many sheep do you keep in a flock?

A. Well, in our commercial flock we have from 100 to 125, but I would rather have from 50 to 75 in the winter time. We fix our barns so that we have from 100 to 125. Of course they have plenty of room. Now, during lambing season in that commercial flock, it is quite a task to take care of those lambs, they come so rapidly, sometimes twenty-five or thirty in a day.

Q. About what time do you want them to lamb?

A. I like the commercial flock to lamb about the tenth of April. We never turn our rams in until about the tenth day of November.

Q. What kind of sheep are your commercial flocks?

A. Sheep I picked up in the Buffalo market. They are a mixture of everything.

Gentlemen, I thank you for your attention.

The President: Our Treasurer now has a word to say on a very important subject—and I know that he will talk to the point, for he always does:

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# A PENNSYLVANIA STATE FAIR

BY J. F. LANTZ, GLENMOORE, PA.

Gentlemen:

According to the programme the subject of this discussion is "A Pennsylvania State Fair." We have been asked on several occasions when Pennsylvania would have a State Fair, hence we have slightly changed the wording of the subject of the discussion to the question "When will Pennsylvania have a State Fair?"

In the dawn of twentieth century progress and advancement we are somewhat discouraged in the realization of the fact that in order to advance the agricultural and live stock interests to a point which would be in harmony with the spirit of the times it becomes necessary to discuss such an issue as a state fair for Pennsylvania; an issue which in our bordering States has long since become a thing of the past, and has crystallized in the realization of high class State exhibitions; especially is this true of New York, Ohio, West Virginia and New Jersey.

We turn to the science of agriculture, and behold! the wonderful advancement compared with what it was fifty years ago, or along in the early fifties. Go with me, if you please, on a tour of inspection of our breeds of live stock within the borders of this commonwealth. We will start at Philadelphia, we will travel west through the beautiful Chester valley, continue west through central and southern counties, up to the New York state line through the western tier of counties, and back through the northern counties to the Delaware river, and note the marvelous improvement in the science of breeding and feeding compared with fifty or even twenty years ago; we listen with pleasure to our lecturers, who through the latest practical scientific research are educating us in the best up-to-date methods of breeding, feeding and caring for our stock, in order to reduce the cost to minimum, and make the highest per cent of profit on a given amount of feed, showing almost miraculous advancement along these lines, compared with the methods in vogue one-half century ago. Along about 1851, our farmers fed to their cows fifty cent corn with a ratio of 1 to 16, producing from 3 to 4 thousand pounds milk per head per annum, and let 20 dollar per ton bran with a ratio of 1 to 4 run down the tail race, which would have produced from six to eight hundred pounds of milk per head per annum, besides, saving the annoyance of the splitting of tails, to kill the imaginary wolf, and the boring of horns to fill the hollow cavity with air. While we note with pleasure the advancement along all these lines in Pennsylvania, similar advancements in our neighboring states, with New York, Ohio and New Jersey fifty years in advance of us in representing their products at their own state fairs, in competition with those of other states, we feel that to answer the subject of our discourse, When will Pennsylvania have a state fair? would be equal to the task of raising the Egyptian mummies, or restoring again the dead languages to common use.

### Public Sentiment.

I will not, and it is not necessary, before such an intelligent and practical body of stock breeders as is here assembled, take the time to discuss the innumerable advantages to be derived by the agricultural and live stock interests of this commonwealth from a good state fair where the advancement in Pennsylvania could be compared with that of other states. Having traveled over quite a large area of the state during the past year, my business having been with farmers, I find the sentiment generally in favor of a state fair, and find it generally conceded that such a fair would be an advantage to our various agricultural and live stock interests.

Our people in Pennsylvania learn largely from observation, especially is this true in matters pertaining to agriculture and live stock, and a high class state fair, with a good premium list, open to free competition for all the states, and Canada, centrally located, with cheap railroad rates from every section of the state, would furnish an object lesson for our farmers which would result in much more good than we anticipate. Instead of pure and perfect bred high-class animals appearing on paper alone, which is commonly supposed in many sections of this state, they would appear in living reality, and in numbers that would impress our farmers and stockmen with their possibilities, and would create a general trend toward improvement. Such fairs bring the people in closer touch and create enthusiasm, which always conduces to greater effort and more rapid improvement.

But to turn to the subject of our discussion, "When will Pennsylvania have a State Fair?" I will answer, not next year. Will you kindly permit me to ask the question, Why doesn't Pennsylvania have a state fair? and I will answer it with much greater ease, than I can the subject of my paper. The reasons why are not many, in fact they can consistently be boiled down to the number two. Only two obstructions in the way, or to use a common expression of antebellum days, there are "two big mountains fo' to cross."

### The Old Society.

The first great obstacle in the way of a permanently successful state fair, with expansive ability commensurate with the progress of the times is an old act passed by the legislature in 1851, to incorporate "The Pennsylvania State Agricultural Society." This society was incorporated for the purpose of holding an annual state fair, and to advance the interest of agriculture in general. Let us pause for a moment and look at this wonderful law, which they tell us cannot be repealed. Let us take a look at the workings of this wonderful Pennsylvania State Agricultural Society, which, so far as a state fair is concerned, has retrograded to a point even beyond that of half a century ago when the law was passed creating it. I quote the following from Section 1 of this Act, after naming certain individuals (some of whom have long since passed away) who met in convention at Harrisburg, and signed a constitution of some kind, this Act says: "Be and they are hereby created a body politic and corporate in law, by the name of "The Pennsylvania State Agricultural Society' and by that name shall have perpetual succession, and have capacity to sue, and to be sued, and may have a common seal, which at their pleasure may alter or renew." Let me repeat, "and by that name shall have perpetual succession, and have capacity to sue, and to be sued." Why did not our breeders, among whom was our lamented friend John I. Gordon, who during that last display at Johnstown made as fine a display as ever shown by one man, in this or any other State, why did not our breeders read this Act, and sue for premiums justly due them? Why? Listen, I quote from the same Act, Section 3, that the sum of two thousand dollars out of any money in the treasury, not otherwise appropriated, be and the same is hereby appropriated to the said society. Why did they not sue? You may answer the question for yourselves.

Do you know that in 1876, a law was passed which absorbed all the good and useful qualities of the act of 1851, which were few, indeed, and robbed it of everything but the name, which was to be perpetual, and the two thousand dollars not otherwise appropriated, and yet failed to repeal that stagnant old law, which has long since out-lived its usefulness, and has become a blot to the fair name of Pennsylvania. Gentlemen, this is the kind of a law which stands of in the way of a successful state fair. This is the kind of state law, they tell us cannot be repealed. It might have answered the purpose in 1851, when our farmers ate corn, fed corn, and let their bran run down the tail race of the old mill dam, but today it is a blot to the agricultural and live stock interests and the fair name of the Keystone State, which ought to be removed.

### The Appropriation.

Let us look at that clause in Section 3 again: That the sum of two thousand dollars out of any money in the treasury, not otherwise appropriatedy, be and the same is hereby appropriated to the said society." Will you be surprised if I tell you that this society is still living. It is, and some of its members hang on to its perpetual name, and the two thousand dollars not otherwise appropriated, with such tenacity as though their very existence depended on its perpetuity. Yes, gentlemen, this society still lives. It has passed through the storms of civil war, it has passed the crisis of the Spanish-American war, and although the state fair has long since become a thing of the past we have ample evidence that the society still exists, and the two thousand dollars, not otherwise appropriated, still accrues to said society. We have not seen a public financial statement, or report from this incorporated society, as is required by law from similar public corporations, but we know that this society is still in existence, because when called to account a few years ago by this association some representative of the society, with tears in his eyes, offered an apology, from which we inferred that the society was insolvent, and that the two thousand dollars not otherwise appropriated was not sufficient to pay salaries, expenses, premiums, etc., hence the premiums were not paid. This law

has not been repealed, the society which it created still lives, its assets consits of a perpetual name, and two thousand dollars per annum not otherwise appropriated. I think it has its home down about Harrisburg somewhere. I saw in the paper some time ago that it met in the office of one of its Vice-Presidents, and elected a long list of Vice-Presidents, which is about all it can do, on the two thousand dollars, not otherwise appropriated. I wonder what A. J. Cassatt, Theo. Voorhees, Samuel W. Pennypacker, Joseph C. Sibley, William A. Stone and other like personages would think if they knew they were hung onto the tail end of such a society as its Vice-Presidents.

When will Pennsylvania have a state fair? Not until the people of this commonwealth, in justifitable indignation, order this law from the statutes of Pennsylvania.

### The Second Mountain.

The second obstruction which they tell us blocks the way for a state fair in Pennsylvania, is a clause in the new constitution which was adopted in 1874, which I quote from Article 3, Section 16, as follows: "No money shall be paid out of the treasury, except upon appropriations made by law, and a warrant drawn by the proper officer in pursuance thereof." From this we are informed that an appropriation for a state fair would be unconstutional, unless such appropriation were made through and under the direct management of someone of the government departments. If such is the case, this section of Article 3 ought to be amended, for we can never have a successful state fair in Pennslvania under a department whose head is appointed by the governor as a reward for political favor, who in turn would dish out political plums to a state fair commission, regardless of their interest in or fitness for the work. A state fair can never be made a success in Pennsylvania under the dictation and management of any political party.

When will Pennsylvania have a state fair? Not until this section of the constitution be so amended that a state fair commission may be established by law, which would be entirely free from political rule and influence.

When will Pennsylvania have a state fair? When these two obstructions are overcome, and the legislature passes an act creating a state fair commission; said act designating that such commission be composed of representatives from the organizations which represent the different agricultural, and live stock interests of the state, carrying with it an appropriation sufficient for the needs of such commission to put a state fair on a solid financial basis, and bring it up in every respect to the spirit and progress of the times in which we live. Then and not till then will Pennsylvania have a state fair!

After a great deal of discussion upon the foregoing paper, in which many views were expressed, a motion was made and seconded that the matter be referred to the Legislative Committee of this Association to take proper action with the end in view of having an act passed appropriating money for the state fair. This committee was instructed to have its report for the next annual meeting in the form of a bill providing for a state fair.

The President: Gentlemen, I now have the honor of introducing Dr. H. P. Armsby, of State College, and I guess we all know that he is the highest authority on feeding animals that we have. He is going to talk to us on "Some Things We Don't Know," I presume because it would take him too long to tell us what he does know.

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## SOME THINGS WE DON'T KNOW

### DR. H. P. ARMSBY, STATE COLLEGE, PA.

Mr. President and Gentlemen of the Pennsylvania Live Stock Breeders' Association:

Let me remove any apprehensions on the part of my audience at the outset by saying that the emphasis of this title is upon the word "Some." At this late stage of the proceedings, and after the feast of good things you have had, I assure you I shall not attempt to touch upon all the things we do not know.

It is usually expected, I believe, from a Station man when he goes to a meeting of this sort that he shall tell some of the things that he does know, but it seems to me that once in a while it may be well to change this custom and call attention to some of the things we do not know, but ought to know. The business of the experiment station is to investigate the unknown to find out some of these things that now we do not know, and I think that those who are interested in agriculture—the farmers, fruit growers, stock raisers of the state,— those for whom this work is being done, should have some fairly good conception of the problems still awaiting solution, and so I propose to take a few minutes this afternoon to point out some of the directions along which we need to know more, especially in connection with the feeding of live stock.

The one question which in various forms is constantly asked of any one who is supposed to possess some knowledge of the principles of stock feeding is "What is the best food or ration for this or that purpose?" This question is a recognition of the fact that some more accurate method than simple observation and experience is necessary for an accurate comparison of the worth of the different feeding materials, and not a little study and investigation has been expended in the attempt to work out such methods.

The one at present in vogue I may assume to be tolerably familiar to this audience. It is based fundamentally upon investigations begun over forty years ago and continued with more or less vigor up to the present time. This method attempts to split up feeding stuffs into their chemical constituents, grouping these under the three main heads of protein, carbohydrates and fat, and distinguishing further between the disgestible and indigestible portions of them. It is assumed that the total of the digestible protein, carbohydrates and fat represents substantially the contribution which the material in question can make to the nutrition of the animal, while its so-called nutritive ratio, that is, the ratio of the protein to the carbohydrates plus fat, indicates whether it is more suitable for one or another kind of production. This method of comparison assumes that digestible matter from different sources is equally valuable. Now, as a matter of fact we know that this is not the case, although we have rather blinked this fact until recently. Practical experience teaches us that digestible matter in coarse hay or straw is far from having the same value as an equal number of pounds of digestible matter derived from corn meal or cottonseed meal, and we have practically recognized this difference between coarse fodders and concentrated feeds by maintaining a fairly constant proportion between the two in our computed rations.

### Digestibility.

Of recent years, however, this difference has been the subject of more specific scientific investigation and there has been shown to be another variable factor in the case besides digestibility, namely, the amount of energy which has to be expended in the digestion and assimilation of the food. It has been noted in our own experiments at the Pennsylvania Station, for example, that the work which a steer must do in chewing, swallowing and assimilating timothy hay is such that out of every hundred pounds of digestible matter about thirty-seven pounds must be burned up to supply the energy for these processes. On the other hand, in the case of corn meal the loss of energy is much less, only about 17 pounds out of every hundred pounds of digestible matter being burned up for this purpose. In other words, if we give timothy hay enough to supply 100 pounds of digestible matter, there will actually remain for the general uses of the animal body only 63 pounds, while if we supply one hundred pounds of digestible matter in corn meal 83 pounds of it will be available for the general uses of the organism.

When it comes to an actual gain by the animal, it seems that a still further expenditure of energy is necessary to convert the digested vegetable material into the tissues of the animal body, but of the amount of energy required for this purpose we know as yet comparatively little. In the case of timothy hay and corn meal we may state these relations approximately and subject to future correction in the following little table, which shows the number of pounds or of units of energy, out of every hundred of digestible matter which are used for the purposes named.

| | Work of Digestion | Work of Tissue Building | Available for Gain |
|---|---|---|---|
| | Per cent | Per cent | Per cent |
| Timothy hay, | 37 | 30 | 33 |
| Corn meal, | 17 | 33 | 50 |

According to these tentative figures a pound of digestible matter in timothy hay would be worth to a fattening steer about two-thirds as much as a pound of digestible matter from corn meal.

A large amount of work by a somewhat different method has been done upon this problem by Dr. Kellner of Germany. He sums up his latest results in the statement that a fattening steer will produce approximately the amounts of fat started below for each pound of digestible nutrients consumed:

One pound of digestible protein produces .235 pounds fat.

One pound of digestible carbohydrates produces .248 pounds fat.

One pound of digestible fat produces .598 pounds fat.

The above figures apply to concentrated feeding stuffs. In the case of coarse fodders he states that there should be deducted from the amount of production above computed .143 pounds of fat for each pound of total crude fiber contained in the ration.

These figures of Kellner's seem to offer the possibility of computing with some degree of accuracy the actual nutritive effect which may be expected from a given feeding stuff when fed to a fattenting animal. His investigations are, as yet, partial, however, having been upon cattle entirely and covering only the fine concentrated feeds on the one hand, and the coarse fodders proper on the other, while the practical value of his results still remains to be demonstrated. We need more extensive data and, in particular, much study of the best methods of utilizing practically the scientific facts which we have or may secure.

Many of you are interested in meat production, either as breeders or feeders, and I therefore selcet this branch of feeding to illustrate what I have just stated regarding the need for further investigation along these lines. We need investigations both of the physiological principle involved in meat production and of the economic applcation of these principles.

### The Fattening Process.

As one item under the first of these heads may be named the actual nature of the fattening process. When we fatten an animal, our aim is substantially to improve the quality of the meat. The increase in weight of the fattening animal, as we all know, rarely pays for the feed consumed in producing it. Just what the nature of the improvement produced in the meat is, however, we do not know. We are unable to say whether it consists in the deposition of fat between the muscular fibers or whether it is some change in the composition and properties of the lean meat proper, the production of fat being rather an incident. If the latter should prove to be the case, it would raise the further very practical problem whether it might not be possible to secure meat of high quality without the great over-production of fat which so often accompanies it.

Another important question is that of the relation of the age of the animal to meat production. It is commonly stated that young animals produce meat more economically than older ones. This may be true, but Waters has convincingly shown that the data upon which this conclusion has been largely based are defective in that they failed to take account of the influence of the condition of the animal. It is well established that the actual production of muscular tissue (lean meat) is more active in the young animals, but whether the actual fattening process is carried on with any better advantage is certainly an open question.

### Amount of Feed.

How much feed should be given to a fattening animal? In other words, is it more economical to give the animal all he will consume or to lighten the ration somewhat. Various factors must be considered in answering this question. First comes the digestibility of the ration. We have been taught that, within moderate limits, the amount of feed does not affect digestibility. Our own experiments seem to demonstrate that where very light rations are concerned this is not the case, and it has not yet been demonstrated, so far as I know, that the very heavy fattening ration is as thoroughly digested as a lighter one. Furthermore, aside from the question of digestibility, it has not yet been shown that the matter actually digested from a heavy ration is as well utilized as from a lighter ration. Personally, I am inclined to think it is, but it is demonstration and not opinion that is needed. Still another question in this connection is whether a rapid gain of weight caused by heavy feeding has any influence, favorable or unfavorable, upon the quality of the meat produced.

Still another question, and the last one which I shall mention, is that of the necessary protein supply in meat production. Protein is the expensive ingredient of our rations. How little of it can we safely feed to animals of different ages? Is it possible to force the growth of lean meat by an abundant protein supply and, if so, is the gain a profitable one? Is the protein of coarse fodders and concentrated feeds of equal value and is it economically possible to substitute, to a considerable extent, the former for the latter?

The questions which I have raised above, I have classed as physiological questions. They concern themselves largely with the fundamental laws of animal nutrition such as we are attempting to work out in our investigations at the State Experiment Station. We must have these scientific facts as a basis for rational stock feeding, but before we can safely use them their application must be tested by means of large scale experiments under the conditions of actual practice. Such tests, while they rarely or never establish principles, are indispensable in working out their practical applications. As fast as we get light on any of the points named above, their applicability to practical questions should be tested by experiments including the purchasing, feeding and final marketing of a considerable number of animals. Time does not permit me to go into details on this point, but I wish to be clearly understood as holding most firmly that both scientific and practical investigation is necessary if we are to make real progress in this or any other agricultural matter.

My main reason, however, for calling attention to these points on which further light is needed has been the hope of interesting members of this Association in the matter. It is well sometimes to look forward and consider what still remains to be done. The work of the Experiment Stations of the country, and of the Pennsylvania Station in particular, depends ultimately upon the interest taken in it by the farmers and stock feeders of the country and the extent to which it can succeed in serving them. In order that its investigations may be directed along profitable lines, it is essential that it should be in close touch with them, and that it should know what problems they are studying, what difficulties they meet. On the other hand, however, it is equally essential that they should have a clear apprehension, not only of what has already been done but of what remains to be done. It is with this in mind that I have grasped this opportunity to speak of some of the things we don't know regarding stock feeding, hoping to both interest you in attempts at their solution and to receive the benefit of your suggestions, criticisms and questions.

Mr. T. E. Orr, Superintendent of Poultry at the Louisiana Purchase Exposition, at the request of the Association, made a few remarks about the appropriation for the live stock exhibit at the St. Louis Fair.

(Adjourned to meet February 11th, 1904, at 9.30 o'clock a. m.)

Association met at 9:30, with a good attendance.

The President: After the report of the auditors we will proceed with the program. [The auditors reported that all accounts were satisfactory and recommended more energy in securing members.]

The President: Mr. Munce is here and has his paper with him, but is too hoarse to read it. Mrs. Munce, however, has consented to do so, and we shall now listen to our first address by a lady [Applause for Mrs. Munce]:

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## ON GOOD TERMS WITH THE HOG

### R. L. MUNCE, CANONSBURG, PA.

Probably I cannot explain my subject's title better than by stating that since 16 years of age I have been a breeder of hogs in a small way, thus covering a period of about twenty-eight years. You can call me as my neighbors do "A Hog Man" with emphasis on the "hog" part, or "man" as the humor you are in may dictate. I acknowledge that with these many years of association with the hog I find that today I am only a beginner, and that daily there are many new lessons to be learned and the old experiences to be counted as things of the past. I also with some trepidation and trembling appear here, knowing that I am but "a sapling among ye giants of the forest, ye great oaks in the field of breeding, fitting and marketing the more complete productions of your idea and ideal." But taking courage from the old and trite saying that "we may learn even from children and fools," I venture a few suggestions in the way of opening this topic, hoping that by abler hands we may have a development of it that will form some purpose in our minds to apply the lessons here gathered from the different breeders and feeders, so that from a dollar and cents point we can be satisfied and from a pleasurable point even more than satisfied. I realize that the points we here must cover, and I see the rest of you are covering, are different from those we must take up and advocate and even plead for before an audience of mixed farmers. You who are here, with few exceptions, are convinced already that the pure-bred sire and dam of such breeds as you have chosen and stand pat for is the only way to realize profit in full and pleasure complete. Some seem to think that they are making little or no progress unless they are belaboring the other fellow and his breed, and the more expert they are at this the more progress they are making.

My experience and observation is that there is little in this and that we deprive ourselves of many happy moments by educating ourselves to such a course. We allow you all to have your fun, but life is too short and competition too keen to allow any sensible breeder of pure-bred stock to think he or his selection is the only pebble.

### A Fixed Purpose.

Don't understand me now to be advocating a slip-shod or go-easy manner, an undecisive mind in carrying out your purpose, not at all. We must have a fixed purpose, a very decided one, and first, last and all the time stick to that until we have learned by actual facts attained or acquired that we are on the wrong track and, like the great locomotive that has taken the siding, by easy stages and proper manipulating of the switches and sidings we get back again on to the main track, for jumping over at one bound from where we stand means wreck. How many are the breeders whose business bones you can see strewn all along the way just because they had no fixed ideas of their own, and only did things that others did, so very often picking out for their purpose those traits that they were least able to carry to a successful completion, never once being able to adapt themselves to such points as they know they can and will be able to make go. If I am so fortunate as to have before me today a man who is just starting in the pure-bred stock business, let me, if I go no further, say to him and urge him to pick on such a type of the breed, whether it be horse, cow, hog, sheep or poultry, as he finds after very careful examination of himself first and then of the different breeds, has, I say, the most points to his liking. Don't be carried away now by what any breeder either tells you or shows you. We all tell and show many good points —and we just as often fail to point out many defective ones. I delight in having a buyer come into my stables and do his own selecting. I am relieved of many responsibilities and learn a great many things useful to me in breeding and dealing in the future. I can generally very soon tell when a man enters the barn where his choice is going to fall, if there is anything there that suits him at all.

### Balanced Breeding.

Now I only mention these facts to lead you up to what I call most important things in the selection of sires and dams to head our herds, or make crosses of improvement on grade foundation. Grade foundation we will always have with us, because it is so much easier to see the impress of a first cross of a full blood than any cross in the line afterwards. Hence a man who does only what he sees and never thinks long enough to follow out his rule more than one year, does that which makes pronounced marks at every stroke. Today he breeds for hair, tomorrow for ear, the next day for face and snout, the next for ham or back or teat, etc., having before him only one idea and that given him by some one or animal that has left the last impress on his plastic mind. I thus explain to my satisfaction why we do not have more good breeders and why so often when we next meet a breeder we find him breeding another kind or breed of stock, talking up what he has and talking down what he had. In fact that chap is all talk, so let me plead for men who are first, last and all the time found with one breed and that the best of its kind as near as they can get it. It sounds sometimes big and gulls many on paper to be running a string of breeds. But when the man who knows and is making a success of breeding wants foundation stock or herd heading stock he goes as a rule not to the man of many breeds but the man of one breed.

There are many reasons for this. A few of them are: We know accidents will happen where more breeds of stock are kept than one, both as to mating and impression. Then the man with many years of experience is able to produce for you something that is more likely to reproduce and it is product you want, not theory. Nothing so fixes a type and gives it the power of transmission as a great many crosses of sire and dam. The breeder having the points in view from year to year so intensifies those qualities that we can to a certainty almost expect to get a good showing of their qualities at every mating.

### Cross Breeding.

Just a word about the cross breeding fellow before we leave him. He is all right in his place. He makes a market for many, full blood sires and dams, and he whoops up the breed whose cross makes him the most money, but it has always been a mystery to me to know how he knows with this mixed-up stuff what breed has given him his return and how he is going to know what cross to make next. Hence, arguing along this line, if he follows the line that has given him the last best result, why not use full bloods and thus save possibility of any uncertainty? You can easily see how in time he must have a full-blood cross blooded animal with the very unsatisfactory explanation they are full blooded but can't be recorded. His word and memory against the written record, and none dare doubt his word—but they do.

Now, with the hog we are on good terms, yes, always have been. The horse must be a specialist. He must be a draft horse, a roadster, a saddler or a racer. The cow must be a beef animal, a butter-maker or the producer of big messes of milk to ship, that's all. All these in one and each the best. Well, it seems to me I have heard some differences of opinion in that. Have you? The sheep makes either great quantities of wool or mutton, or both in moderation, or dog feed in certain localities. Then we hear and read very often that the nation takes off its hat to the hen when she comes in with her tons of poultry meat and thousands of dozens of eggs. When eggs are plenty we keep our hat on, when scarce we take it off and she takes the eggs off the market. But the hog —he goes on from year to year in the even tenor of his way, furnishing us with our breakfast bacon, our sugar cured hams and the shortening for our pies, and has not an enemy to contend with, except as little pig he sometimes gets laid on or takes the thumps, or as a big pig he strikes a corner in pork, or once in a while he strikes a lot of howling things advocating the bacon hog. A hog all lean, just a small pocket in his carcass to hold a gallon of lard but entirely separate from the rest of the pork. But he squeals and grunts for more corn and his good American friend gives it to him, gives it to him for four months before he is born and gives it to him from six to eight months after he is born. He in turn takes it and with what other odds and ends he can gather and are presented to him such as refuse from the kitchen or greasy dishwater, makes it into a nice compact, neat hog, which in turn is made into again the great product called pork.

### Profitable Pork.

We are on good terms with the hog because by our sticking to him he has stuck to us, and we find when we have hogs to sell we always have money to buy with. Think of it, ten to twelve months after you have bred your sows you can market your product! Market it in the shape of good, well-developed pork. It is not termed baby pork or baby lard or baby product of any kind. It is a product that goes into every channel of trade. It can go in tin cans or air tight vessels or it can go it alone, and where is the man, woman or child that does not appreciate in some form and consume great quantities of the product, and come back year after year wanting more?

But "pork is not healthy!" Who said it's not healthy? As proof of this fallacy I point you to the millions of dollars worth of it that are being and have been consumed and the people live to want more. Not healthy? Give the hog a chance and he is the most cleanly of all the domestic animals. He is as sanitary in his habits as the most fastidious human being, and when he is the object of filth and squalor, and made the subject of disease, it is when man has so surrounded him that he has no choice in the matter. The hog does not need expensive quarters to live and do well in; he can be accommodated more easily than any of our animals. He needs first access to pure air and water; these go hand in hand with good feed to make best returns. So long as he has a clean spot to eat in and a clean dry bed to sleep in, with the prevailing wind shut off so that it cannot blow directly on him, he will do well and make a profit. The rest of his surroundings he will keep in order if he has room. Some think it absolutely necessary to have a place for the hog to wallow in. I do not. Even in the hottest weather shade and dry surroundings will keep him healthy and much more presentable. If the wallow is fed by a good live stream that flows in and out of the wallow, all right, but if fed by only enough water to make a mud hole, or mortar bed, I look on it as a very dangerous place to allow hogs to go. Hogs will often start a wallow, especially in our tough lime stone clay. He roots out a place in the earth to fit his body and probably get cool earth to lie in. Then the rains fill this up and you have a real disease breeder or retainer and an unsightly spot on the farm. When we have such places we drain them out first and then fill up with earth and go after the chap that roots with the ringer.

### How It is Done.

Now in passing I will only mention a few more things and then leave the subject with you. We are all anxious to know how or some of the hows of the other breeders. We have a few fixed ideas and stick to them. First, I select the most promising sow pigs for my own use according to my idea. I grow them along as fast as possible, keeping in mind always a full development without injury by too fast crowding. We aim to have our breeding sow fairly well developed before putting on her the burdens of motherhood. We do not, unless accident or some unforeseen thing happens, breed a sow until she is one year old. We are thus producing from nearly developed sire and dam, and our experience is that from these we get the largest and best litters and sows which take good care of their pigs. Our herd being mostly to supply breeders for other herds, we think it wise to follow a somewhat different plan than we probably would if we were only making pork. First, I want good bone and size with good form in sire and dam. We do not advertise or make any effort to reach the greatest number of pounds in the least time. I know by this course I have often lost a buyer, but I know just as well that, by the other plan, when I have sold once to a man I can count him as a friend and a customer thereafter. Our feed for this is always depending on grass in season and exercise the year round to do their part, a very important one. We feed corn, whole grain always, a little bran with white middlings, more in winter than summer. No bran with brown middlings. In winter we use oil meal, one-sixth oil meal, five-sixths shorts and bran or brown middlings. In summer very little oil meal, but some. I use some gluten meal but not much. This is supplemented at times by ground oats or rye, sometimes mixed and ground together. We feed both dry and in thick slop, mostly in the wet form. It seems to give us best results all told. With these mixtures and good sows and boars, we succeed in keeping on good terms with the hog and expect to make him one of our farm animals as long as we keep stock.

I think I have urged already a fixed purpose to be developed in a breeder of any kind along the line of his chosen breed, but it is also another hobby of mine to have the work carried on by more than one generation. I earnestly hope and even pray for the day when our farms and herds shall fall into, not the hands of new men and novices, but the sons of herdsmen with the things they have learned in the pens, stable, fold and show yard, that they will take up the lines that have fallen to them we can truthfully say surely in pleasant places and that all countries with one accord will rise up and come to America to get the best of every kind.

## DISCUSSION.

### Value of Milk.

Question. Do you use skimmilk in feeding your pigs?

Answer. I don't think there is any feed so well adapted to the development especially of breeding hogs as skimmilk. But, of course situated as we are, we don't get to use as much of it as we would like to. There are several reasons. In the first place, our whole family is before you and you will understand why I advocate in my paper passing those things down to my boys and girls. And in our locality, nearly all of our neighbors are dairymen and they ship their milk away. We don't have access to creameries. I look upon milk as one of the most useful feeds in raising hogs, especially for breeding purposes, as it developes the hog in every direction. I mean in every direction. I think that is what everybody wants in a sire or dam.

Q. Is rye a good food for hogs?

A. We find it a very good feed. Of course rye has this fault, especially in hot weather, you have got to be very careful with your slop barrels not to make up very much at a time. If you do this it is likely to sour, and there is a difference of opinion about sour slop or food. We use it as far as possible sweet—sour food we don't believe in. We believe sweet feed of every kind is the proper feed for all animals.

### Two Litters a Year?

Q. (Hon. J. M. Berry). Do you think we can afford to breed hogs for stock purposes but once a year? Or one litter a year for market purposes?

A. Of course, there is a difference of opinion about the number of litters in a year. We used to make it a rule to have just as many litters in a year as was possible. We never allowed our sows to go barren; we kept them working all the way along, and I think anyone, if he has got a good breed of hogs, any of the several good breeds, can make a profit out of his feeding and have two litters a year. Because, in the first place, you don't make any pork so cheap as you do the first two or three months of a hog's life when it is suckling its mother. We aim to get our best results, our best profits, while the pig is being fed through its dam. I think anybody can make a profit in hogs, following this course. Don't ever allow a pig, from the day he is born, to want for food. Keep him growing all the time. Of course, as soon as the hog begins to dig for himself give him such food as is adapted to him, and until he has done that feed him plentifully through the dam.

Q. The reason I ask—I am interested a good deal. I have been experimenting along this line for quite a number of years, and it was a question in my mind as to whether it actually paid to breed two litters during the year. In the first litter (about the first of April) we find there is a great deal of profit, no trouble to raise a litter of pigs and grow them for the market in six months time, but if you want a sow to breed again in October and the fall months of the year I very much question, with the price of feed in this county, whether it does not clear away too much of the profit.

A. Of course, what I am going to suggest might not be profitable in every locality. But you men are supposed to be breeders. I consider that when a man has a good bunch of hogs or cattle or sheep, that are pure-bred, it pays him to raise them any time in the year, because then you are always ready to go into the market with a product that is good. On the other hand, you are always in the market with something that you can sell to better profit to somebody that wants a herd, and you are ready to supply that. Now my experience is this, that people take these notions all times of the year. That is, they all don't want pigs in the spring or in the fall, but they want them the whole year round. I find, as a breeder, that it pays me to have pigs on hands at all times of the year, something to sell to the man when he wants a sire or dam. I find I also get more profit out of it. You see how you can adapt yourself to these circumstances and very easily satisfy yourself by experience that it will pay you.

A. Mr. Norton: In reference to two litters a year, I think that has a great deal to do with your circumstances and if you have plenty of skimmilk at home you can raise two litters a year to get large, but if you have to depend upon dry feeds, especially grain feed, your pig must stay on your sow longer than if you have skimmilk. I had a litter of pigs and told the men to feed them all the skimmilk that they could for about five months. They were killed about three weeks ago, and they averaged over one hundred and sixty pounds a piece.

Q. Have you fed any hardwood ashes? If so, does it have any effect on the bone?

A. I can't answer that. We have never used that to any extent. In the first place, we don't have them, and in the next place we never feel the need of anything of that kind. I will just say this in regard to two litters a year. We have adopted the system lately of having the first litter come in March or early in April. Then we only allow them to stay on the sow about six or eight weeks—not over eight weeks, then we immediately breed our hogs again. We allow the sow to wean the second litter herself, and then breed her again. We have also plenty of time to breed for the next spring. I believe, all told, that is the most profitable way for anyone. I can see no reason at all why a man should allow a sow to run idle so long in the year to raise one litter of pigs.

### Wheat as Hog Feed.

Mr. Lantz: In Chester County, we have a great many dairies; we also have a great many Chester White hog breeders. Some of the Chester White breeders don't own any cattle, and we are all trying to figure on the cheapest food to raise those little white pigs—in place of milk. Mill feed costs us from a dollar to a dollar and a quarter per hundred pounds. Last fall wheat was a cent a pound. Can we safely grind our wheat and feed it to these little pigs? We can feed the milk cheaper than the mill feed.

A. I think there is profit in hogs properly fed and cared for, properly fed with any of those feeds which you spoke of. Of course, when it comes to feeding dear wheat there are times in the life of all breeders, in the life of all businesses, when probably our profits are not as great as others, and probably no profit, but taking it for a series of years I think you can use mill feed at a profit.

Q. Do you consider ground wheat a safe and profitable feed to pigs regardless of a comparison of costs?

A. No. Of course, it is good feed. We find it a very good feed. Our little experience with wheat is this: That we could not get any better—I don't believe I get as good results—from feeding hogs ground wheat as I did from feeding them good shorts. That is the experience we have had; that good shorts seem to give better results than ground wheat.

Mr. Norton: I would not take the ground whole wheat meal as a gift to feed to brood sows, for myself. There is no feed I have ever fed that I have had such good luck with as the bran middlings. I don't like bran myself; oats are too expensive to feed hogs, and the horsemen get hold of them, and if I were to select feed to feed hogs, it would be oil meal and brown middlings, as Mr. Munce says. I would bear him out in that. I think skimmilk is protein feed, and protein feed don't break a hog down; corn meal will do that sometimes with young hogs when too plentifully and solely fed.

Q. Do you feed grain when hogs are on grass?

A. Under our circumstances, I feed a little grain all the year round, feed corn always, and the reason we do it, our experience has been favorable. Of course, it is not our main feed at all. We feed corn sometime during the day during the whole year. I am working, of course, to make the best returns as breeders for ourselves and for our customers. We give the pigs some corn and then shorts, whatever skimmilk we can get hold of, the more the better, and some oil meal, gluten meal the same, ground oats. As I have told you, those are the things we have learned by experience pays.

Q. Did you ever feed any cottonseed meal?

A. No sir.

Q. How about bran?

A. I don't look upon bran as of very much use to us at all.

Q. Do you think you can feed quality into pork?

A. I think so. I don't see why you cannot feed quality into pork as well as into milk. I do know if you give a cow good, rich, nutritious food that she will make you far better quality of stuff in every direction than if you don't give it to her. She must have something to work on.

### Roots and Silage.

Q. Do you feed your brood sows, during the winter, mangel roots?

A. No. The reason we don't use mangels is because I have been a cripple for the last six or eight years, and of course there are times when a person has to supplement farm help with his own hands. We used to raise mangel roots and beets and used them in winter time. We found them very profitable, and the reason I quit them was I could not get them planted and tended.

Q. Have you ever tried silage?

A. No sir, but very little. We have silage and I have fed some but the little we used did not impress me favorably.

Q. What is your experience in regard to the product from the two litters—you breed for the trade—you breed for breeders—when you sell to men who wish to exhibit, what is your experience in regard to the two litters? Can you raise any better hogs from one litter than you could from two?

A. I could only answer that in this way. As, I told you, we have been in the habit of trying to keep our sows at work all the year. My answer in that line would only be where sows have missed, and our experience in that line, as far as I have observed on that point, is that we get as good results from two litters a year as when they miss and only breed once. We believe in putting on the counter the goods the people want. I do want to say this: I believe that a great many people at the present time are making a mistake in regard to their hogs in this way, they are breeding them too fine in bone and neat in form, especially the sows, and the result is small litters.

At the conclusion of this address and discussion, on motion, Mrs. R. L. Munce was unanimously voted the thanks of the Association and made an honorary member.

The President: Mrs. Munce is our first lady member, and I am sure the honor is ours. We shall now listen to our New York friend on "Fitting Sheep"—Mr. Duncan:

## FITTING SHEEP FOR THE SHOW RING

J. C. DUNCAN.

Mr. President and Gentlemen of the Pennsylvania Live Stock Breeders' Association:

I assure you that I wish it were possible for me to put this matter properly before you so that you could thoroughly understand it, because it is a subject that is so hard to get many people to understand—fitting sheep for the show ring. It cannot be done in a day, nor a week, nor a month. We cannot make a success of it that way. In the first place, to make a success of fitting sheep for the show ring we must make our selection right. Without that we will make a dismal failure. It will be actually a waste of time to go to fitting sheep if we do not make the proper selection—or any other animal for that matter. Now, it is my custom, and with all sheep men who make a business of showing sheep at the fall fairs, along about the middle of March to draw from our flocks what we think will be suitable for our exhibit the following fall. They must be selected with great care. There are so many minor points to consider that unless a person thoroughly understands a sheep he will think that the one is just as good as the other. You have got to see to the quality of the wool; you have got to see to the color of the skin; you have got to see that they stand properly on their feet, and you have got to see that their points are developed fully so that they will suit the eye of a capable judge. Now, in picking out those sheep we generally do that along about the middle of March, and then from that on until the first of April, if we happen to get a warm spell of weather for a few days, we generally take off their fleeces. Then as soon as I take the fleeces off, I take a solution of sheep dip and thoroughly wash them so that I get the skin in a good healthy condition. After that they are kept by themselves, and we begin to feed them a little more heavily than we have been feeding them during the winter, although it is calculated that they have been always on full feed. The next thing will be to thoroughly understand the condition we want to those sheep in. You have often seen a lamb or calf when it was about a month or six weeks old, when it was getting a full supply of milk from the dam—that lamb or that calf was then in an ideal condition for the show ring. That is what an expert breeder calls "bloom." Every particle of the body is covered easily and the skin has a sort of rubbery touch which seems to suit you. Now if we could keep our stock in that kind of condition we would never have to do anything, and really that would be the proper way to do it; but it is necessary to select those animals and keep them by themselves so that they have a little extra care to carry the sheep on to get them in the right condition.

### Don't Overfeed.

A great many peeople make a mistake in fitting sheep for the show ring by shutting them up and feeding them. I never had success in shutting my show stock up. I always see that they have a run where they can go out and in whenever they feel like it. Around our sheep barn I have their paddocks, an acre and a half in each paddock, and those sheep can go out and in whenever they please, just as they see fit. They are fed generally three times a day along from the time they are sheared until, say, along about probably the last of June or the first of July. Then we generally reduce our feed a little, as the case might be to suit the time we expect to take those sheep out to the show. To feed those sheep properly it is necessary to have a variety of food, something that they like—that they have a very particular fancy for. From this time on we will feed a great deal of roots to those sheep, with a little oats, bran and oil cake. Their hay is all cut up. You have got to be careful of that. We have to cut the hay. We have a trough where we put the grain so as the grain and roots can be fed in one trough. The hay is cut up in quarter-inch lengths and put on the wide trough so it would not get over their faces and noses; for if you feed them the long hay they would get their heads in the hay, wear the wool off their faces and spoil the looks of their heads, and the first thing you know all your work would be for nothing. Their wool would be full of hay seed when you bring them into the show ring.

### Green Feed.

In the spring of the year I always prepare plenty of green food, so that I can have it to give them all the time; also I generally sow close by the barn probably two acres of rape where I can turn those sheep out in the cool nights. Then if they are just turned out for an hour of an hour and a half they will fill themselves up and they run back into the shed, and they seem contented again. And I find from now on in feeding those sheep we have got to keep a supply of roots. We get our rye ready to cut; then we can stimulate them a little in that way. After that we generally have peas and oats to feed during the summer, and rape, and I also try to have roots to carry them along until the middle of July, so I never lack green food, and that is the most important thing in fitting sheep—have lots of green foods, because you ruin more sheep with grain than you ever make show sheep. You can hardly do without it and it is necessary to have, and it seems to me you must have these actual feeds that are natural to a sheep if you ever expect to make a success of fitting sheep for the show ring.

Now we come to a point where we begin to trim those sheep, and I wish it were only possible for me to have one here, so that I might show you so much better than I can tell you. It would be a delight to me to do so. I find good sheep are all right anywhere. We usually take and trim a little on those sheep whenever we have spare time during the summer months. It does not do to go to work and trim them up all at once. That won't do. You can cut the fleece in a much nicer condition if you feep a sort of smooth surface from the time he is sheared until the time you take them out to show, although usually in the head of Shropshires we trim that but very little. The most expert I have ever seen with the fleece of a sheep was Dr. Davison's shepherd, a young man who last year told me he never had the shears on his sheep's head until the time for the State Fair at Syracuse, in New York State. He says his father taught him that, and he says he always found it was a good plan. He liked to have a little fringe there to take off the bare look when he started out, because if you have a good start and get your sheep up well to the front, it was pretty hard to get them set back again, going through the circuit and he always liked to keep the head and just trimmed them a little previous to the first show.

In fitting sheep some people use blankets to keep them clean, but I must say that I have never adopted that plan through the fitting season; because sometimes I have to go away from home in the morning and do not get back until night, and I have to do most myself. I have adopted troughs and put their feed in and they don't get any around their necks or backs, or anything like that. Now, gentlemen, that is really about all there is to fitting sheep for the show ring. Just provide them green foods and be careful not to feed them too much grain. I find that a great many people make that mistake when they first start out to the show with their stock. They start them out and they do not want to let them get guanted up from the time they leave home until they get to the fair. I think it is a great mistake. I would just advise you if you start out to the show do not be agraid of letting them get hungry. You take and put a sheep into a car and it is out of its natural condition and it don't masticate its food, and if you keep feeding them something they like very well they will be apt to gorge themselves very much, and by the time you get down to the fair the sheep is off its feed, and it is all out of condition, and it will take you two weeks to get it back into condition again.

It is my practice to feed very little on our trip when we start out to the show, and I find it is a very great advantage to me later on.

I will be glad to answer any questions now that you may care to ask.

### Raising Roots.

Question. What kind of roots do you use?

Answer. Mangel-wurzel roots and swedes. They will keep along until August; I have fed them in August. I don't usually feed my young lambs any of these roots until they weigh probably seventy-five pounds. It seems to me that if they get too many of those roots when they are too young, it is bad and apt to start scours. The one way I feed roots to young lambs is to throw them in to them and let them nibble at them.

Q. What kind of soil do you aim to grow your roots in?

A. On a sandy and loamy, with a clay subsoil. We never fail to get a crop of mangel-wurzel roots.

Q. What time do you plant your mangel seed?

A. About the 15th of May. I usually manure the ground in the fall very heavily and plow that ground in the spring as early as it is practicable. We usually keep harrowing that ground, maybe twice a week, to kill all the weeds. It is not such a difficult task to grow those roots, if you know how. We plow the ground in the spring and harrow it every week, and then along about the middle of May we take a double-mold board plow, a plow with two mold boards—you can use a single mold plow just the same, have used it where I did not have the double-mold—we take and run a line nice and straight, so you can shoot a crow along. It looks so much nicer. I generally do it. We ridge that ground, giving an application of salt, about five hundred pounds to the acre, and after that is ridged up we run a roller over them and then take a small seed drill and run along those ridges and ten days after sowing go through with a cultivator and turn the cultivator points so that they won't throw any dirt on to the young plants. I can clean out three-quarters of an acre a day easily, and when I was a boy I have seen my mother clean out an acre. This is not very much trouble. If you only get the bacteria into the soil you will get roots there that will weigh from twenty to thirty pounds a piece.

Q. How many bushels can you get to the acre of mangels?

A. I don't know. We had this year about twelve hundred bushels to the acre. This year our crop was not as heavy as it generally is—about twelve hundred bushels. I think we could grow in a good season at least fifteen or sixteen hundred bushels to the acre, planted thirty inches apart in rows. That is wide enough. Often plant them twenty-four inches apart. As they grow straight up, they are not like a hill of corn that spreads out, they grow straight up in the air. I find twenty-eight to thirty inches will do very well.

Q. Do you ever sub-soil?

A. Yes.

Q. Don't you get the same results by ridging up?

### Dry Feed.

A. By the time we get those roots hoed through we have very little ridge left.

Q. In Pennsylvania we have a great many sheep men who understand sheep husbandry very well, who have to carry their flocks through the winter without providing any succulence. Of course, they often lose one-third of the flock, but they dont' mind that. They are expecting it. And they make enough profit out of the remaining two-thirds and still make sheep husbandry profitable. I want to ask you, Mr. Duncan, what you would think if you had to come to Pennsylvania and carry your fine breeding flock through the winter without providing succulence. I want to get this before our sheep men of Pennsylvania.

A. Well, I fully understand the position and I realize the value of the bluegrass pasture for sheep in the winter because you can run your sheep out on feed here in Pennsylvania better than we can in New York, just the same as we can in New York better than they can up in northern Canada. It is almost impossible there to get flocks out of the barn. They find it an absolute necessity to get those roots for their flocks. I know it is a very good thing because in our commercial flocks we run them out every chance we can and they do very well on those bluegrass fields in the winter and we do not need so much succulence any more as we used to. But it is necessary to keep a supply of roots in the winter to keep them growing. For instance, we have our last year's lambs coming along and if we had nothing but bluegrass pasture for them, I do not think it would be as profitable to me.

Q. I see so much loss among sheep men, and so many of them discouraged in Pennsylvania, owing to the lack of their providing succulence for winter foods, and I would like to ask you, with your past experience, if you could carry a flock of breeding sheep through the winter successfully without providing the succulence as some of our breeders do in our State?

A. In the absence of a supply of succulence, either roots or silage, I should supply bran and oil cake chiefly as a grain ration and if possible on good days let them have the run of a bluegrass pasture and if you have a supply of good hay, either clover or alfalfa, they should come through all right.

## AFTERNOON SESSION.

The President: The report of the committee on nominations is now in order.

The committee reported the following, who were unanimously elected:

President—W. C. Norton, Aldenville.

1st Vice President—Dr. Leonard Pearson, Philadelphia.

2nd Vice President—M. P. Shoemaker, Greensburg.

Secretary—E. S. Bayard, East End, Pittsburg.

Treasurer—J. F. Lantz, Glenmoore.

Executive Committee—W. G. Powell, Shadeland; Edward Walter, West Chester; D. Norman App, Selin's Grove; William Berry, Washington; George C. Watson, State College; James Blair, Hartstown; The officers of the Association ex-officio.

Legislative Committee—Dr. Thomas Turnbull, Allegheny; H. W. Comfort, Fallsington; R. L. Munce, Canonsburg; W. F. Gable, Altoona; S. E. Nivin, Landenburg; Henry Palmer, Avondale; the President and Secretary, ex-officio.

Committee on Transportation—T. E. Orr, Beaver; Dr. J. Cheston Morris, Philadelphia; F. J. McCain, Mercer; Jos. T. Fleming, Belleville; F. C. Bosler, Carlisle.

Committee on Fairs—W. C. Black, Mercer; W. H. H. Riddle, Butler; J. L. Henderson, Washington; J. D. Detrich, Flourtown; W. F. McSparran, Furniss; L. D. May, Granville Center.

The President: I thank you for the honor, although I told the Committee I thought it would be better to change. I want the cooperation of every one of you. I don't want you to think that the president and secretary can do all the work. We will try and do our share. We do want your help and must have it if we succeed in this movement we have on foot to establish a state fair in this state that will be a credit to the state. We must have the assistance of all the live stock breeders and agricultural people of this state. You can go to Harrisburg and do anything you want if you know there are the people back of you, but we must be united in this effort. Our officers have been most faithful and efficient, and we are having here the best stock breeders' meeting ever held in the state. Let us carry on our work with enthusiasm, and we shall succeed.

The President: Gentlemen, I know you have all heard of the gentleman who is now about to address us and who has come from Illinois to do so—Mr. L. H. Kerrick. He has, as you know, won more prizes for fat steers than any other feeder in America, and when he talks about beef cattle we know we are listening to the highest authority.

# BEEF-MAKING

## HON. L. H KERRICK, BLOOMINGTON, ILL.

Gentlemen of the Pennsylvania Live Stock Breeders' Association:

I have come a long way to talk to you today, and would like exceedingly well to be of some use to those of you who are interested in beef cattle breeding and feeding; and I think I can be, if we get into our subject at the right place and in the right way. All my experience in beef production has been had in Illinois. Conditions for making beef here differ widely from ours, and yet in some respects, there is similarity.

It was not practicable for me to write a paper to read you today. I could not have found the time to do it, and besides, I hardly knew whom I would meet or how many of you, or what would be of most use and interest to you. I have recently had the pleasure of reading an article on the subject of beef-making in Pennsylvania, written by one connected with your agricultural college. I could write no better than he. Possibly I have had some more actual experience in the business than he, but I would not for a moment claim to have any better or more accurate knowledge of beef-making than he, so far as his experiments reach. [Mr. Kerrick refers to Prof. Mairs' address before our Association at Harrisburg.]

I will not talk to you for a very long time. I think we will get the most out of this meeting by talking together. By your questions, I will find out what you most want to know; then if I know what you want to know, I will hope to be of some use to you.

Beef is the imperial flesh food of the race; it always has been and no doubt will continue to be. Our people are consuming an enormous amount of beef, and the quantity consumed will probably be increased rather than lessened. There are conditions which point, I think, clearly to higher prices for beef in this country.

### Beef Will Be Dearer.

I hardly think that you of the East or that we of the West, the next twenty-five years, will eat as cheap beef as we have the past twenty-five years. Beef-making in the United States for many years past has been a mighty uncertain kind of business. Our beef-cattle men have been on the ragged edge for a good many years. Some years we have had a good profit in our business, then for some years very little profit, and then for other years, sharp losses. Many of our producers of beef in the corn belt are quitting the business because it does not yield them more certain profits. Our lands are getting to be so high-priced—they are so valuable for raising corn and grain of various kinds, that much more of it will in future be devoted to these latter purposes than in past years. There are no large areas of land from here to the Missouri River on which beef cattle can be raised and fed now, unless they are to bring better prices than they have averaged heretofore. You will hardly find a man in Illinois now, north of the South Central portion of the State, that feels like he can devote his land longer to raising cattle for beef, at present prices; and so it is with a good many other lands this side of the Missouri River.

If you look at the receipts of cattle at the principal markets yesterday and for a month past, and on back for several months, you would be likely to think that beef cattle are increasing in this country; but if you will look a little closer, you will find in the character of those receipts indications that they point to less beef-making, and consequently to higher prices in the future. Of the thirty thousand cattle received in Chicago yesterday, not many were range cattle; they were mostly natives. Only about two-thirds of the usual out-put of the range came to market during the past year. But there was a day when we had at Chicago forty-four thousand cattle, and another day when we had forty-two thousand, and others as high as thirty-six thousand and thereabout.

These excessive receipts are made up of all breeds, of every conceivable degree of quality and condition. And they are of all ages. It is significant also that a large proportion are calves and females. From it all, and from all I have heard of the discouragement among beef producers, I conclude that many cattle-men everywhere are going out of the business. And from this, the next conclusion is that beef eaters in the United States and those foreigners who buy beef of us will hereafter pay more for it. Food of almost every kind is likely to be abundant and cheap in a big rich new region like the Mississippi Valley; and beef will be cheap along with other products. But the West is no longer a new country. Land, labor, corn, clover and all that go to make good beef, are getting on a permanently higher level there, just as in other parts of the world; and we need not longer look there for the abundant supply of cheap beef formerly produced there.

### Pennsylvania Beefmaking.

And here is what I am aiming to lead up to. You have in Pennsylvania, probably more than one-fifth of all the people that live in the United States. You will consume a great deal of beef, and you will either buy or produce it. No doubt you think you have paid enough for it in the past; but if my point of view is correct, you will pay more for it in the future, if you buy it. It would look like, if you can—if conditions are such here that you can profitably, you ought to try to raise some good part of your beef.

I do not know just what stock of beef cattle you have at this time. I think you have six or seven hundred thousand in this State—good, bad, old and young. I am sure you have some good pure bred stock. You probably have not as much of a stock of beef cattle as you had formerly. This could be said of almost any State except a few of those in the West, like Iowa, Texas, Kansas and Missouri. You raise everything here that goes to make good beef. I think you raise something like fifty million bushels of corn a year, probably forty mililon bushels of oats, and four or five million tons of hay. Many varieties of nutritious grasses grow well here, and I would think that you have a considerable area of land better adapted to grazing than to plow; this, on account of your more broken or rolling surface. Your climate is just the kind in which good beef is made.

If you undertake here in Pennsylvania to produce beef, it seems that you would better undertake the whole act. I mean by this, it is up to you to breed, raise and feed. It is a long way from you to the range country, which in all probability will hereafter be devoted almost entirely to raising feeders for the corn belt and for feeding districts generally. But the range is being all the time curtailed in area, and there is more than enough feeding ground between you and the range to absorb all the range output of feeders. And besides, transportation charges over so great a distance would seriously handicap the feeder in Pennsylvania. If you make beef here, it will most likely be made on cattle of your own breeding and rearing. You are going very largely in the East to dairying. I do not doubt but the proportion of dairy cattle to beef cattle is increasing rapidly. Dairy bred cattle are not the kind out of which to make beef. For milk and cream and butter, they are all right, and indeed just the right thing; and if I were in the dairy business strictly, I think I would have little use for any but the best dairy breed.

### Bred for a Purpose.

However, the average farm is not a dairy. The average farmer has the need of milk and cream and butter, but he also has need of beef to use and to sell. It is easy to get milk for the farm and butter enough from cows of the beef breeds. We used to do it in Illinois and other states. For the average farmer, I believe a small herd of beef bred cows is a better proposition than a herd of dairy bred cows. The former will furnish him, as I have said, all the milk and butter he will need, and besides, he can be raising some good ones that will consume many by-products of his farm and many things he could not bale up or measure up and sell in the market, and converting these into good beef for which there will always be ready sale here.

I would advise the Pennsylvania farmer who has lands well adapted to grazing and not so well adapted to the plow to displace his Jerseys and others of the dairy breeds, with some good Shorthorn or Angus cattle, or any of the beef breeds; this provided, as I have before indicated, that he is not in the dairy business strictly. I would advise, of course, that he get none but good ones, and typical, just as well adapted to the purpose of beef-making as can be found, or his means will permit him to buy. Do not think of fooling with inferior stock. There is very little land left in this country on which it will pay to raise any kind of poor stock, poorly adapted to the purposes for which it exists. And indeed there is little need of raising such stock. Good stock well bred up for the purpose for which it is designed can now be had at such reasonable prices that it is folly and waste of time and money to bother with inferior kinds. For my own part, if I were starting a beef herd at this time in Pennsylvania, I would start right out with pure-bred and registered cattle.

### Start with Good Ones.

These can be bought now at prices scarcely higher than I have known good grades to bring; and the advantages of the record in raising and improving beef cattle are very great. To illustrate: I have two herds of cattle—a pure-bred herd and a grade herd. We are striving our utmost to improve the qualities of both these herds; but the work is easy in the pure-bred herd, compared with that in the grade herd. Here comes along an exceptionally fine calf in the pure-bred herd. He developes into a great bull or a prize-winning steer. Don't you see, we know where he comes from—the date of his birth was recorded along with the name of his sire and his dam, and at once we can trace his lineage for many generations. If we want another like this outstanding good one, we know just where to go to get him. Suppose an equally good bull calf comes along in the grade herd. We note of course, that he is a fine one, and he developes into a great steer; but after he is two years old, more than likely no one on the farm will know just how old he is, nor what his sire or his dam. Not knowing where he came from, we do not know where to go to get him again.

In these times when excellence is in such great demand, when improvement is the watchword, and when nothing but the best we can do or accomplish is to be thought of, I say to the young man or old who is starting in beef-making, to start with the pure breds. With just a few cows to begin with, retaining the females from year to year, one will soon find himself with all the cattle he wants for any farm of moderate size.

I have one pure bred cow about sixteen years old now, still in full vigor, still bringing us calves. If I had kept all her female descendants, I think I would have as many cattle now as a man would need on a farm a mile square. We have sold some of her female descendants, and still I am not sure but we have as many of her progeny as would stock a farm much larger than the average of Pennsylvania farms. But whether you start with pure breds or high grades, make sure of one point—to start with good ones. But what is a good beef animal? The same that would have been considered good or best in beef type twenty-five years ago would not be thought best now. I can well remember when the bigger and fatter and heavier a load of cattle, the higher price it would bring in Chicago and other leading markets. This is all greatly changed. There is very limited demand now for beeves of over 1,550 pounds, live weight. A man would be in good luck to find a buyer, at a top price, for an old time load of cattle weighing 1,700 or 1,800 pounds, no matter how well bred and fed.

### Early Maturity.

Early maturity is the first and highest consideration now in beef cattle raising. Whoever thinks of producing beef now in the United States is up to a proposition something like this: How to get the largest amount of the best beef in the shortest time, with a given amount of feed and care. Early maturity, as I have said, is the one thing to strive for. We probably will never want again the 1,700 pound three or four years old steer. The thing we want is a 1,300 to 1,500 pound steer produced in two years, or just as much less time as we possibly can.

The bull is half the herd. This expression is true as far as it goes, but it does not tell the whole truth. He is half the herd on the first cross, the second cross three-fourths, and in but a few generations, he is about the whole thing. Therefore, in breeding cattle, all possible care should be exercised in the selection of the bull. Since early maturity is the one thing most desirable in beef cattle breeding, make sure in choosing a bull that he give indication at every point of being of the early maturing kind. It would be hard to put on paper all the marks and indications of this quality, but the cattlemen soon learn to recognize them. Along with it goes always a rather fine bone; short legs; neat, comely, smallish head; short neck; level, wide back, and a general roundishness and plumpness of form, with that mellow touch so easily felt and scarcely less easily seen.

We are breeding pure bred Angus cattle and selling a great many bulls. We meet with a variety of notions in our customers, but most of them are catching on, and we note the majority have learned to look not so much for the "big growthy" fellows, as formerly. They have fed that kind no doubt, many of them, and have found to their cost, that when they got them matured—filled and finished to a proper thickness—they had fed them too long for profit and had a product too heavy to bring the best price.

To cut it short, select your bull if you know how, and if you do not know how get somebody else who does know how to help you, that will bring you calves of the early maturing kind. Then about all there is to say further when you have calves that are bred for early maturity, mature them early. I think the time is well past us when we can afford to let calves grow up to steers of two years old or three, and then "fatten" them by rushing the feed to them in excessive quantity for a short period. Since a steer has but a single mission in the world, which is to make beef, why not put him at his job just as soon as he is able to work at it; and that will be not long after he is born. Certainly he will be able to begin before he is weaned. Every day that a well bred steer goes short of the amount of feed that he can convert into beef that day he is failing to make as much money as he is capable of making. There are conditions of course which would modify this statement.

Some have lands that from their nature can only be used for grazing, and of course one might have so much of such land and so few cattle that the few he has might be profitably left to make their whole living and gain on grass. And I do not deny that with a sufficient and steady supply of certain kinds of grasses, steers may make rapid and profitable gain. The point is, that with grass or corn, or grass and corn, the thing to do is to furnish your steer enough that he may be all the time working up to his capacity for beef-making. Do not let him loaf around a year or two, merely making a living for himself and making little or nothing for you; and besides, he will never and can never make the best and highest priced beef in this latter way.

### Growing Beef.

Our grade calves are generally allowed to run with their dams, taking all the milk. Sometimes, when they are a few weeks old, we have separated them from their mothers, giving them comfortable shaded pasture lots and permitting them to go twice or three times a day to their mothers. I like this way better than allowing them to run all the time with their dams. It is better for the milking capacity of the cows. If the udders are allowed to fill up, the tendency is to develop milking capacity, while if the calves are allowed to run all the time with their mothers, sucking at their will and many times a day, milking capacity is dwarfed, more or less. There is another advantage taking the calves away from their dams during the day—both dams and calves on account of the necessary handling, are made and kept more gentle and are more easily handled, which is quite worth while. We teach our calves to eat some concentrated feed several weeks before they are weaned, so that when the weaning comes on, it is without shock or loss to the calf, or inconvenience to the cow.

The first feed of our calves consists of corn meal with a little mixture of oil meal, and maybe some ground oats or bran or any other good thing we may have. A very little of this kind of feed is spread thinly in the troughs while the calves are learning to eat, so that none may get more than he ought to have at first. There are always some precocious one that will eat more than is good for them, and there are others that are slow about taking feed. You must be cautious about starting your calves on feed. Once safely started, we simply keep them going every day until they are of such weight and thickness and finish as will meet with the very best demand and bring the highest price. We feed our steers twice a day in bunks or troughs, in the open.

I should have said before, that all our cattle, pure bred and grade, are reared out of doors except that they are provided with good sheds enclosed at north and east and west sides and well roofed, which they may use at will. This amount of housing or shelter, well bedded in the winter season, seems to be about what cattle nature requires for its best development in our climate. We select sites for these sheds that are as well sheltered and as suitable in every way as may be.

### A Variety of Feed.

With this continuous feeding from calfhood to the market, it is necessary to exercise great care to maintain relish and appetite for feed. I might say that variety in the feed is one of the cardinal principles on which we work. Any average good farm in the corn belt will grow a good variety of beef-making feeds, especially if supplemented with some oil meal or gluten meal and bran, which of course will have to be purchased in the market. We never try to carry our steers along on a single kind of feed. Our steers scarcely ever get less than three different things in a feed. Corn of course being our most abundant and cheapest beef-maker, is always the principal part of the ration. But corn may be given in a variety of ways, and we take advantage of this. Sometimes we feed ground corn and cob, grinding it rather fine; sometimes corn meal, leaving the cob out; sometimes we feed shelled corn; and again, whole ears of corn simply broken up by hand over the edge of the trough. Sometimes we feed soaked corn; indeed we generally practice this in June, July and August, when the corn is dry and hard. In fall and winter season, we feed the whole corn—stalk, ear, shuck and all. So you see that corn may be given cattle in many different forms, and in all helps to keep up relish. In our feeding, we always supply a sufficient amount of good sound roughhage; clover hay and corn stover being the principal reliance. In summer our feeding steers get some grass, but when cattle are on what we call full feed, a small blue grass field will furnish a large number with as much grass as they will use and as much as is good for them. I frequently feed two car loads in a fifteen acre field of bluegrass, which will furnish all the bluegrass they will use.

You see our process is very different from that old one which first allowed the steer to get his growth and then fatten him. We make beef right from the start. We have spoken of our work as growing beef. We have come to believe that we can make by this method of feeding, from weaning and before, until they go to market, a thicker and better marbled product than can be made by the old method. The results of our work have been satisfactory to us; we have been able to get the very highest prices going for our product, and will certainly persevere in our methods until we learn something better.

The President: Mr. McLaughlin is suffering from a severe cold, but rather than disappoint us he has come on from Columbus expressly to tell us something about French horses. He lives in France a large part of the time and has bought more French horses for America than any other living man, and no one is better qualified to speak than he.

# HORSE BRDEDING IN FRANCE

### ADDRESS OF J. B. McLAUGHLIN, COLUMBUS, OHIO.

Mr. President and Gentlemen of the Pennsylvania Live Stock Breeders' Association:

I am very glad to be able to be here today, but regret very much that I have such a bad cold.

For a number of years I have spent most of my time in France, so that I am more or less familiar with the different breeds of live stock and the methods of breeding. France is divided into numerous districts, each one of which breeds a certain breed of cattle, a certain breed of horses, certain definite breeds of live stock. In France the breeders follow in the footsteps of their fathers. They stick to the breeds that their ancestors have already tried and found sufficient for their needs. These different breeds have been improved to a very great extent by the great interest which the government has taken in them.

There are in France some five recognized breeds of draft horses. They are named from the places where they are raised. The most important of all, the one that has made the draft horse of France familiar to all of the breeders of America, as well as to the rest of the world, is the Percheron. It is raised in the district of Perche, which is about fifty miles wide and about seventy-five miles long, beginning about seventy-five miles southwest of Paris and extending about seventy-five miles farther. It is on the hills between the two great rivers of France, the Loire which begins in the middle of France and runs west, and the Seine which runs north from Paris to Havre. The next in importance is the Boulonnais, which takes its name from the district of Boulogne, which is in the very north of France near Belgium. This breed of horses, which has not been imported to a very large extent to America, is a heavier horse than the Percheron; is clean in the bone, a little steeper in the hip, a little coarser in the neck, without the action and the life and vigor of the Percheron. The color of the Boulonnais horse is generally white. The next breed in importance in France is the Nivernais, which is bred in the middle of France. It is a race of black horses that has been improved of late years by the Percheron. It has never been imported to a very great extent. The fourth in importance is the Ardennais, which is raised near the Swiss and Belgian frontier, and partakes more of the characteristics of the Belgian. It is a small type of Belgian. The last and least of the draft breeds of France is the Breton, which is a breed of light horse used mostly for omnibus work, and has been improved of late years with the Percheron. It is bred in Brittany in the district in and about Nantes.

## The Coach Horse.

Of the light horses in France, the most important, and the one that the French Government takes the most interest in, is the French Coacher. These horses are raised in the northwestern part of France, in the district near the sea from Alencon in Orne to Havre in northern Normandy, while the Percheron is bred in the district immediately south of this.

The French Government started about three hundred years ago, in the year 1650 I think, to maintain a stable of stallions at a place called Le Pin. That is right on the border between the coach horse district and the Percheron district. Ever since that time, during the different governments that have arisen and gone down in France, this stable has been maintained. But it is of late years under the republic that perhaps the greatest interest in the improvement of horses has taken place. Under the law in France only horses that have been inspected by the government officials are permitted to stand for public service. They consist of three classes. Horses that are approved by the government and are given a large subsidy ranging from sixty to six hundred dollars; horses that are inspected by the government and given permission to serve mares without any subsidy; and the horses belonging to the government. The latter class, of course, are permitted to serve mares and are sent throughout the various districts to serve mares at a very moderate price. In fact, for government horses the highest price that they are permitted to get is 100 francs, or in our money twenty dollars. This makes it so that certain noted horses, especially among the coach breeds, horses like Fuschia, have requests for something over one thousand mares to be bred to them every year. The breeders are compelled to draw lots in order to get the service of these horses at all. The ordinary service fee for government stallions is twenty francs. In France every breeder has a chance to get a good horse owned by the government to serve his mare for a very moderate price. This is a very good thing for the small breeder, the man who perhaps is not as well educated in what is a good horse as the large breeder. They do not, therefore, have an opportunity of breeding their mares to an inferior horse.

## Training Horsemen.

In 1870 the present government started a school at Le Pin where every man who has anything to do with the purchase of a horse, or the approval of a horse, must attend and graduate. Therefore since that time all the government men have been choosing exactly the same type that they have been taught is the best at the school. This has been of very great advantage to the breeders of that country, because the government men, the men who are at the head of the haras, are always members of the jury or judges at all of the shows. So it is not like it is in this country At their fairs the government man is always the chief of the commission to pass upon the horses. At all of their shows in that country they pick on the horses of a certain type, of a certain form, of a certain kind; while in this country and at different fairs the horse that is placed first in one may be placed last in another, simply because the men who judge them do not have the same ideals, have not the same efficiency and perhaps do not know horses equally well.

I do not know that I need tell you anything about the Percheron, the draft horse which is one in which everybody in America is interested. I think you all know the type of Percheron horse—the best the world produces. He will sell for more money in the American markets today than the draft horse of any other breed, and I want to tell you here why I think this is to a great extent true. The horses of a country—and I want you to mark it well—the horses of any country are as much the product of the soil, of the men that raise them—the breeder—as they are of the sire and dam that made the foal. The horses of any section have certain traits the same as the people who breed them. The people of Normandy, where the Percheron and the French Coach horses are raised, are more of the type of the people in America than those of any other country in Europe. They are not the people whom we see caricatured as the Frenchmen in our comic papers. They are men who are descendants from the Normans, the people of William the Conqueror. In fact, the majority of men with whom I do business in Normandy are men as large or larger than I am, so that they are not at all the type of Frenchmen that people in America ordinarily think comprises all of France. These men have been interested in breeding from the time they were old enough to see. Their fathers were interested in the same sort of horses. Their grandfathers and their great-grandfathers were born in the same country. They have been taught to seek for the same breed, the same sort of horses, the same type. They have been taught that in order to raise good horses you must feed them well and you must feed their mothers well while they are carrying them and while they are nursing them. You cannot make a silk purse out of a sow's ear, nor can you make a good horse on the northside of a straw stack in the winter. Good horses of any breed must be cared for, and properly cared for. The people in that section of France do that. The Percheron horse, as I told you, was bred in a district about seventy-five miles long by about fifty broad. The majority of the stallions that stand in the Perche are owned by the large stallion owners; they are not government horses, they are horses that have been approved by the government.

## The Percheron's Home.

The stallions are mostly in the central and middle parts of this region, the mares are in the outer edges. This country, except the little valley in the middle which is a country of pastures, is a country of culture. The colt as a suckling colt is not turned out to pasture. He is kept in the stable and the mare is worked—she is worked hard, but she is fed well. The colt is always under the eye of the breeder. The breeder probably has only one or two mares. He has not enough means to keep the colts after they are weaned, so at weaning time the colts are all sold to the men who live in the middle part of this district: the men who own the stallions—men like Perriot and Aveline. So at six months old the colt is taken up into a pasture country, where he is kept until he is a year and a half old, unless he turns out to be an inferior colt, when he is sold immediately. But ordinarily they are kept by the big breeders (as they call themselves, but as we would call them horse raisers, not breeders) until they are a year and a half old. Then the colts are sold to a district a little farther north where they are put to work. So that from the time they are a year and a half old until they reach the age of four years they have earned their keep, and I think myself that the working of draft horses, not too hard—the way they work them there—has been instrumental to a very large extent in giving the breed of Percheron horse the strength, the force, the endurance, the activity, the ability to move a heavy load at a rapid rate, that no other draft horse in the world possesses.

The coach horse is bred, as I have stated, north of the Percheron district. They are not intermingled; the breed is not mixed up in the least with the draft horses. They are a race of horses that has been developed since the Percheron horses. Their breed is not as old as the Percheron. The native mares of this country were good mares; strong, rugged, hardy, low down and short legged. About one hundred years ago the government began improving them by crossing them with Thoroughbred horses. They continued this judiciously until about forty years ago. The Thoroughbred, you must all know, is the Arabian or English race horse. It is the only type of horse that we recognize by the name of Thoroughbred. Other breeds of horses which are distinct breeds are called pure-bred horses or full-bloods. At the present time and for many years past the improvement has been made and attempted solely within the breed itself. They are not making any more outcrosses to the Thoroughbred. This gives a race of coach horses possessing more strength, more vigor, more action, more endurance, than any other race of coach horses or any other breed of coach horses in the world. For many years the government has been choosing and selecting horses of this breed that were of the finest and highest type, which were able to trot fastest in a long distance race. The coach horse of France is the trotting horse of France. They have not been able yet, and it has been tried many times, to take any American horse and put him under the same conditions on the same tracks as the French coach horse and beat him in a race. That has been attempted time and again. Their races are trotted over sod tracks hardly ever less than two miles, but the most of the races are from two miles to two and one-half miles. As they race their horses these long distances under saddle so they produce a breed of horses with higher action, possessing more endurance, that trot faster than any other breed of coach horses in the world. I don't know but that you are getting a little tired and I will stop and answer any questions that you may ask.

Question. Do you know the horse population of those two districts?

Answer. The Percheron district produces about twenty-five hundred stallions, about five thousand colts a year, and I am informed that the coach horse district produces about three times that number.

Q. You say there has not been any outcross with Percheron stallions?

A. There has not been in the Percheron district in France any outside blood brought in there for years and years as long as we in America know anything about it, and they tell us there has not been for years previous.

### Percheron Color.

Q. How about the color?

A. Now the color of the breed, as you all know, has been apparently much changed. Ordinarily twenty years ago the color of the Percheron horse was grey. The usual Percheron horse that is brought to this country today is black. The two colors in horses that are nearest and most closely related one to the other are black and white. These are the two colors that are the easiest to change from one to the other in a breed. When I was a boy my hair was black; I did not have any gray ones that I know of. Today it is a little white. The people by selecting the darker colored horses among the Percherons have made the breed a darker color than it was even twenty years ago.

Q. Are there many bays?

A. There are very few bays, and if one happens to come out of the breed he is never permitted to serve a mare in the Percheron district. I never saw a bay Percheron that stood in the Percheron district. If they have any of that color there, they are all sold to go down into the other sections of France or for exportation. They do not permit the mares to be served by bay horses.

Q. Any chestnuts among the Percherons?

A. Very infrequently. I think in all my experience I have only seen three chestnuts.

Q. Are they still improving the Percheron?

A. I think he is better today than he ever was.

### Working the Colts.

Q. Did I understand you correctly that they put their colts to work about a year and half old?

A. Yes, a year and a half old.

Q. When are these colts inspected?

A. They receive their first inspection when they are two years and a half old.

Q. How are your government approved colts marked?

A. Marked with a star.

Q. Are they docked at the same time?

A. The docking is simply a question of taste with the breeder; it has nothing to do with the inspection. The government approved colts have the star right on the neck, something like a dollar mark. If you look at it closely—of course sometimes it is not burned in so deeply that you can see it very well—you will see it is a mark made with a hot iron. The horses are inspected between the last of September and the beginning of December, depending upon the place. If upon inspection a horse is found deficient, the first year the government officials do not mark the animal in any way; they simply tell the man the horse may be out of condition. They are not marked in any way, neither are they absolutely refused except that they can not stand for public service the following year· but when they are three and a half years old, when they are presented, if they are not passed, the government marks an "R" on the same place on the neck, so that a horse that is marked with an "R" is one that has been refused by the government.

Q. How about the mares, are they registered, or are they bred simply for type which the government has approved?

A. The mares are recorded.

Q. All recorded?

A. Yes, all that are eligible to record.

Q. Do they use government stallions to the registered mares?

A. Yes, but the greater part of the government stallions of the Percheron breed are used to improve the breeds in the other sections of France. They send the Percherons to the Boulonnais district and the Ardennais district and the Breton district. There are only to my knowledge six government horses standing in the whole Percheron district. There is a station at Pervencheres and Belleme of Percheron horses belonging to the government and at the other end of the district there are two at Mondobleau.

The Percheron is the most important of all draft breeds of France and they are the breed that the government buys the most of. They are the breed that is the oldest, the strongest and the best and breeders themselves take more interest in keeping it pure, in improving it, than the breeders of any other breed so that the government is not compelled to pay so much attention to the improvement of the Percheron horse in the Percheron district except in the way of granting subsidies.

Q. And what about mares, why are so few Percheron mares exported?

A. Because the breeders will not sell the best ones.

Q. What portion of the stallions are castrated?

A. The draft horses of France are not ordinarily castrated. The light horses are all castrated. The draft horses that work in Paris, those that are not mares, are all left stallions. They are hardly ever castrated.

### Grey Horses.

Q. Do you find a sentiment or discrimination against the color of the grey Percheron horse, and if so, is there any foundation for such discrimination?

A. Very decidedly we find this discrimination against grey and very decidedly I think there is reason to the contrary. The grey horse will always sell for as much or more on the markets than a horse of any other color. The grey colt will sell for ten dollars more on the Chicago markets, on an average, than a colt of any other color; because then the purchaser is certain he is getting one from a Percheron horse.

Q. Is the grey more desirable usually than the black?

A. That is a question of taste. I think so. I think the grey color is the best. It doesn't fade as much in the summer and holds its color better. If you come out on a hot day when the temperature is one hundred in the sun, you don't put on a black coat if you can avoid it. You do not wear a black hat. Why? Because the black color does not radiate any of the heat that strikes it; it absorbs it all. Take in the winter time and put a piece of black cloth on the snow in the sunshine when the temperature is down to zero, and you will find the black cloth will sink in the snow. Put a piece of white cloth by the side of it and you will find that it will stay on the top. So in the hot weather the black horse is at a disadvantage.

Q. Do you think it best to work a stallion?

A. I think so very decidedly. I think the greatest reason why some horses are not as sure as they might be is because they do not get enough exercise. I think that a stallion that is kept in a stable tied up to halter day after day, week after week, and month after month, will reach exactly the same condition as a man if he were put in a cage and not able to get out and exercise.

### Working the Stallion.

Q. Don't you think that the working of a sire has a great deal to do with the disposition of the offspring?

A. Well, there is not any question but that the more a breed of horses, the more any breed of animals is handled, the more domesticated they are, the quieter they become. I do not think you would notice it to a very great extent in any one horse, but in the end the result of handling, working, or being with stock makes them very much quieter.

Q. Aren't the horses so valuable that the people would not work them? Do they work their most valuable stallions over there?

A. They do. I would not put the best stallion that I had on the streets of Pittsburg on a day that is so slippery that he would be liable to slip and injure himself very severely, but I do think that a horse that is so weak physically that he is not able to work is so weak physically that he could not possibly produce good results. I do not think any horse is too good to work.

Q. Did I understand you to say there was no new blood being brought into the Perche?

A. No sir, not that I know anything about.

Q. Do I understand they are inbreeding any?

A. No new blood has been introduced in the Percheron horse for thirty years at any rate. About one hundred years ago there was an old Arabian stallion called Gallipoli who was the ancestor of the horse called Jean le Blanc, whose name appears in the majority of the pedigrees of all Percheron horses, but that has been a number of years ago; that was I think in 1801.

Q. What is the limit of service of matured stallions in France?

A. The government requires that the three year old stallions shall serve at least fifty mares a year, and four-year-olds sixty, to draw the pension.

Q. Is it naturally supposed, as it is in America, that the genital organs of a horse can be degenerated by overbreeding?

A. Without question. But overbreeding is not always the number of mares that a horse can serve in a year or season. I do not think it would hurt a horse as much to serve one hundred and fifty mares a year for three hundred and sixty-five days as it would to serve seven mares in one day. So it is not a question of the number of mares the horse is put to, but it is a question of what he is compelled to do under high pressure in a short time.

There is another thing that is not perhaps in my province to say, and perhaps not in line with what you want me to say, but, if I lived in Pennsylvania I might have a dairy farm; I might raise beef cattle; but if I wanted to make money I would raise horses. There is not any state in the Union where horses can be raised cheaper than right here in Pennsylvania. Your land in Pennsylvania is not worth any more per acre than it is in Ohio or Illinois. You have in Pennsylvania large pastures which we have not in Illinois, Indiana, Ohio or Iowa, where the ground is practically all under culture.

You are nearer the markets than any other state, and Pennsylvania ought to be one of the greatest horse breeding states in the Union. Your feeders of draft horses instead of buying their horses in Pennsylvania come over to Ohio and Indiana and go out to Illinois and Iowa and they buy two and three year old horses and pay $150.00, $175.00 and $200.00 for them sometimes, and bring them down here and feed them and make money; while you breeders of Pennsylvania could make very much more money if you had raised those horses and sold them at that price to these feeders.

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## REMOVED AND RETIRED.

F. E. Travers, formerly of Chester county, has removed to Rhineveck, N. Y., where he breeds Guernsey cattle, Shropshire sheep and Buff Wyandotte fowls.

* * *

Prof. Harry Hayward is now located at Mt. Hermon, Mass., and breeds Anglo-Arabian horses, Holstein and Ayrshire cattle, Berkshire and Large Yorkshire hogs and Leghorns. He is in charge of a large farm there.

* * *

William R. Williams of Philadelphia has retired from all business, but sends his good wishes to his former associates. Among other breeders who have retired, for the present at least, are: Geo. W. Church of Waynesburg, Julius Le Moyne of Washington, Horace A. Field of Wellsboro, F. J. McCain of Mercer, and W. H. Rink of Jennerstown.

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## B. L. POST.

During the past year but one has fallen from our ranks—the venerable B. L. Post, of Claysville, Washington county, who died suddenly at his home on June 4 last. We quote from a local paper:

Mr. Post was born March 6, 1823. At the age of 19 he went to work on the farm for his uncle, Charles Cracraft, who operated the mill at Dunsfort, remaining in his employ for 12 years. He next engaged with

George Stoolfire for two years. Mr. Stoolfire owned a tract of 600 acres and each of the two years he sent Mr. Post to Macon county, Illinois, in charge of a large flock of sheep driving them all the way. He took 1600 sheep on one trip and 1300 on the other. The trips took about 68 days. March 6, 1855, he was married to Jane Kirk, daughter of Isaac Kirk. They went to live on the farm where he died, after occuping the farm almost half a century. He was engaged extensively in the sheep industry much of his life time, but during the past 18 years he was engaged in breeding Shorthorn cattle. He was well known; a man of upright character, industrious, and had the good will of all his neighbors and acquaintances. His was one of the best kept farms of this community.

His business will be carried on by his sons at the old farm, the herds and flocks being maintained.

# WHAT WE BREED

## Pure Bred Stock Bred by Members of the Pennsylvania Sive Stock Breeders' Association

## HORSES.

### THOROUGHBREDS.

| Name | Postoffice | County |
|---|---|---|
| ✓R. S. Hartley | Dugall | Warren |

### STANDARD-BREDS.

| | | |
|---|---|---|
| H. C. & M. R. Elder | Darlington | Beaver |
| Henry Palmer | Avondale | Chester |
| Ezra Michener | Michener | Bucks |
| Powell Bros. | Shadeland | Crawford |
| W. H. Ridge | Trevose | Bucks |
| John B. Kepple | Greensburg | Westm'd |
| Ridge Farm (W.C.Norton) | Aldenville | Wayne |
| W. E. Stevenson | Burgettstown | Washington |
| Jas. H. Cowan | Duquesne | Allegheny |

### FRENCH COACH.

| | | |
|---|---|---|
| Geo. Erk | Seelyville | Wayne |
| Powell Bros. | Shadeland | Crawford |

### HACKNEYS.

| | | |
|---|---|---|
| ✓Powell Bros. | Shadeland | Crawford |

### CLYDESDALES.

| | | |
|---|---|---|
| H. C. & M. R. Elder | Darlington | Beaver |
| Powell Bros. | Shadeland | Crawford |

### PERCHERONS.

| | | |
|---|---|---|
| E. B. Boyle | Canonsburg | Washington |
| W. A. McCoy & Sons | Mercer | Mercer |
| Powell Bros. | Shadeland | Crawford |
| J. M. Main&Sons | Shippensburg | Cumberl'd |
| Geo. A. Hogg | Pittsburg | Allegheny |

### ENGLISH SHIRES.

| | | |
|---|---|---|
| Powell Bros. | Shadeland | Crawford |
| W. L. Christley | Slippery Rock | Butler |
| Geo. A. Hogg | Pittsburg | Allegheny |

### CLEVELAND BAYS.

| | | |
|---|---|---|
| Powell Bros. | Shadeland | Crawford |

### SHETLAND PONIES.

| | | |
|---|---|---|
| Wm. F. Gable | Altoona | Blair |
| Powell Bros. | Shadeland | Crawford |
| W. M. Thompson | Uniontown | Fayette |

## CATTLE.

### SHORTHORNS.

| Name | Postoffice | County |
|---|---|---|
| ✓W. C. Black | Mercer | Mercer |
| John Cummins | Cummins | Greene |
| Eagley Bros. | North Springfield | Erie |
| W. A. McCoy & Sons | Mercer | Mercer |
| R. L. Munce | Canonsburg | Washington |
| W. J. Monroe | Greensburg | Westm'l |
| B. L. Post's Sons | Claysville | Washington |
| Pa. State College | State College | Center |
| Lee R. Scott | Burgettstown | Washington |
| A. G. Shaffer | Rural Valley | Armstrong |
| T. M. Shively | Mifflinburg | Union |
| John D. Smith | Castile | Greene |
| S. W. Solenberger | Chambersburg | Franklin |
| Geo. G. Strosnider | Cummins | Greene |
| W. M. Thompson | Uniontown | Fayette |
| J. R. Truxal | Greensburg | Westmoreland |
| R. C. Vance | Burgettstown | Wash. |
| A. S. Worden | Ulysses | Potter |
| T. M. McKee | Lewistown | Mifflin |
| L. D. May | Granville Center | Bradford |
| L. Douthett | Thornhill | Allegheny |
| J. L. Stouffer | Southwest | Westm'd |
| M. A. Cooper | Washington | Washington |
| ✓A. S. Eagleson | Washington | Washington |

### POLLED DURHAMS

| | | |
|---|---|---|
| Chas Buchanan | Utica | Venango |
| Albert DeFrance | Sandy Lake | Mercer |
| Horace A. Field | Wellsboro | Tioga |
| J. C. Mattern&Sons | Hollidaysburg | Blair |
| Lee R. Scott | Burgettstown | Washington |
| D. C. Andrews | West Newton | Westm'd |

### RED POLLS.

| | | |
|---|---|---|
| D. Norman App | Selin's Grove | Snyder |
| B. E. Ferris | Hector | Potter |
| L. D. Grove | Holbrook | Greene |
| N. O. Brownlee | Claysville | Washington |
| R. W. Crothers&Son | Taylorstown | Wash. |
| T. M. Shively | Mifflinburg | Union |

### ABERDEEN-ANGUS.

| | | |
|---|---|---|
| Geo. Black | Plumville | Indiana |
| Bayard Bros. | Waynesburg | Greene |
| ✓James Blair | Hartstown | Crawford |
| Pa. State College | State College | Center |
| W. L. Christley | Slippery Rock | Butler |

### DEVONS.

| | | |
|---|---|---|
| L. K. King | Westfield | Tioga |
| J. Cheston Morris | West Chester | Chester |
| Powell Bros. | Shadeland | Crawford |
| A. S. Worden | Ulysses | Potter |

### HOLSTEINS.

| | | |
|---|---|---|
| J. L. Henderson & Son | Washington | Wash. |
| H. M. Lyon & Son | Wyalusing | Bradford |
| Miller Bros. | Stonybrook | York |
| J. M. Quivey | Houston | Washington |
| Powell Bros. | Shadeland | Crawford |
| W. E. Stevenson | Burgettstown | Wash. |
| V. W. Johnston | Clymer | Tioga |
| W. M. Benninger | Benningers | Northampt'n |
| Jas. M. Paxton | Houston | Washington |

### JERSEYS.

| | | |
|---|---|---|
| Geo. S. Barnhart | Greensburg | Westm'd |
| J. C. Bebout | Canonsburg | Wash. |
| F. C. Bosler | Carlisle | Cumberland |
| E. B. Boyle | Canonsburg | Washington |
| J. H. Burgin | Huntingdon Valley | Montgomery |
| Leonard & Son | Troy | Bradford |
| R. I. Young | Middletown | Dauphin |
| Geo. Erk | Seelyville | Wayne |
| H. C. & M. R. Elder | Darlington | Beaver |
| C. W. Gammell | Bethany | Wayne |
| R. S. Hartley | Dugall | Warren |
| Wm. W. Harrison | Glenside | Philadelphia |
| Chas. W. Henry | Chestnut Hill | Philadelphia |
| W. F. Holtzer | Greensburg | Westm'd |
| G. H. Knapp | Aldenville | Wayne |
| J. F. Lantz & Co. | Glenmoore | Chester |
| J. M. Main & Sons | Shippensburg | Cumberl'd |
| L. W. Lighty | East Berlin | Adams |
| Robert McCoy | Slippery Rock | Butler |
| B. W. McKeehan | Mt. Rock | Cumberland |
| A. L. Martin | Harrisburg | Dauphin |
| W. F. McSparran | Furniss | Lancaster |
| S. E. Nivin | Landenburg | Chester |
| J. C. Peck | Carbondale | Lackawanna |
| Perham Bros. | Niagara | Wayne |
| Henry M. Phillips | Pittsburg | Allegheny |
| Powell Bros. | Shadeland | Crawford |
| Ridge Farm | Aldenville | Wayne |
| R. F. Shannon | Edgeworth Sta. | Allegheny |
| W. F. Shrum | Adamsburg | Westm'd |
| M. P. Shoemaker & Bro. | Greensburg | Westm'd |
| Edward Walter | West Chester | Chester |
| A. P. Warren | Elizabeth | Allegheny |
| J. B. Wylie | Washington | Washington |
| John B. Kepple | Greensburg | Westm'd |
| Jas. H. Cowan | Duquesne | Allegheny |

### GUERNSEYS.

| | | |
|---|---|---|
| Henry Palmer | Avondale | Chester |
| R. S. Hartley | Dugall | Warren |
| H. C. Bughman | Pittsburg | Allegheny |
| H. W. Comfort | Fallsington | Bucks |
| Wm. F. Gable | Altoona | Blair |
| Henry Palmer | Avondale | Chester |
| Pa. State College | State College | Center |
| N. Poorbaugh | Mt. Pleasant | Westm'd |
| W. H. Ridge | Trevose | Bucks |
| W. S. Stevenson | Butler | Butler |
| Hon. J. F. Woodmansee | Lake Como | Wayne |
| Shook Bros. | Spring Mills | Center |
| Ezra Michener | Michener | Bucks |
| H. H. Snavely | Lancaster | Lancaster |
| I. F. McKee (R.D.No.5) | Washington | Wash. |
| J. H. Peachey | Belleville | Mifflin |

### AYRSHIRES.

| | | |
|---|---|---|
| Thos. Turnbull, Jr. | Allegheny | Allegheny |

### HEREFORDS.

| | | |
|---|---|---|
| J. I. Barley | Baker's Summit | Bedford |

### POLLED ALBIONS.

| | | |
|---|---|---|
| B. E. Ferris | Hector | Potter |

### BROWN SWISS.

| | | |
|---|---|---|
| B. I. Young | Middletown | Dauphin |
| W. H. H. Riddle | Butler | Butler |

## SWINE.

### POLAND CHINAS.

| Name | Postoffice | County |
|---|---|---|
| D. Norman App | Selin's Grove | Snyder |
| J. I. Barley | Baker's Summit | Bedford |
| H. C. Bughman | Pittsburg | Allegheny |
| Burns & Adams | Imperial | Allegheny |
| Eagley Bros. | N. Springfield | Erie |
| H. C. & M. R. Elder | Darlington | Beaver |
| L. D. Grove | Holbrook | Greene |
| L. D. Harrington | N. Water Gap | Monroe |
| W. A. Lothers | Lack | Juniata |
| Henry Palmer | Avondale | Chester |
| Robert McCoy | Slippery Rock | Beaver |
| Miller Bros. | Stonybrook | York |
| B. L. Post's Sons | Claysville | Washington |
| Nelson Spedding | Clifford | Susquehanna |
| T. M. Shively | Mifflinburg | Union |
| A. G. Shaffer | Rural Valley | Armstrong |
| A. P. Warren | Elizabeth | Allegheny |
| J. B. Wylie | Washington | Washington |
| T. M. McKee | Lewistown | Mifflin |
| J. L. Stouffer | Southwest | Westm'd |
| J. H. Peachey | Belleville | Mifflin |
| Edward Walter | Westchester | Chester |

### TAMWORTHS.

| | | |
|---|---|---|
| R. S. Hartley | Dugall | Warren |
| Henry Palmer | Avondale | Chester |
| Ridge Farm | Aldenville | Wayne |
| M. P. Shoemaker&Bro. | Greensburg | Westm'd |

### CHESTER WHITES.

| | | |
|---|---|---|
| G. S. Barnhart | Greensburg | Westm'd |
| E. B. Boyle | Canonsburg | Washington |
| H. C. Bughman | Pittsburg | Allegheny |
| J. Grier Dain | Malvern | Chester |
| Jos. T. Fleming | Belleville | Mifflin |
| Wm. F. Gable | Altoona | Blair |
| H. M. Lyon & Sons | Wyalusing | Bradford |
| J. F. Lantz & Co. | Glenmoore | Chester |
| W. A. McCoy & Sons | Mercer | Mercer |
| B. W. McKeehan | Mt. Rock | Cumberland |
| J. C. Mattern & Sons | Hollidaysburg | Blair |
| W. J. Monroe | Greensburg | Westm'd |
| R. L. Munce | Canonsburg | Washington |
| Edward Walter | West Chester | Chester |
| A. P. Warren | Elizabeth | Allegheny |
| Hon. J. E. Woodmansee | Lake Como | Wayne |
| Shook Bros. | Spring Mills | Center |
| M. P. Shoemaker & Bro. | Greensburg | Westm'd |
| J. R. Truxal | Greensburg | Westm'd |
| W. A. Lothers | Lack | Juniata |
| L. Douthett | Thornhill | Allegheny |
| John B. Kepple | Greensburg | Westm'd |
| A. T. Replogle | Waterside | Bedford |

### BERKSHIRES.

| | | |
|---|---|---|
| George Black | Plumville | Indiana |
| W. C. Black | Mercer | Mercer |
| J. H. Burgin | Huntingdon Valley | Montgomery |
| E. M. Campbell | Leech's Corners | Mercer |
| J. L. Henderson & Son | Washington | Wash. |
| W. F. Holtzer | Greensburg | Westm'd |
| L. W. Lighty | East Berlin | Adams |
| W. A. Lothers | Lack | Juniata |
| J. M. Main & Sons | Shippensburg | Cumberl'd |
| S. V. McDowell & Sons | Fredonia | Mercer |
| W. F. McSparran | Furniss | Lancaster |
| Pa. State College | State College | Center |
| N. Poorbaugh | Mt. Pleasant | Westm'd |
| Ridge Farm | Aldenville | Wayne |
| W. H. Rink | Jennerstown | Somerset |
| R. F. Shannon | Edgeworth Sta. | Allegheny |
| Thos. Turnbull, Jr. | Allegheny | Allegheny |
| Shook Bros. | Spring Mills | Center |
| A. S. Worden | Ulysses | Potter |
| N. O. Brownlee | Claysville | Washington |
| R. W. Crothers & Son | Taylorstown | Wash. |
| J. Cheston Morris | West Chester | Chester |
| Geo. W. Mellotte | Lisbon | Ohio |
| A. K. Miller | Mercer | Mercer |
| A. S. Eagleson | Washington | Washington |
| Edward Walter | Westchester | Chester |

### DUROC JERSEYS.

| | | |
|---|---|---|
| George Black | Plumville | Indiana |
| J. Cassidy & Son | Hanlin Station | Wash. |
| W. M. Benninger | Benningers | North'mt'n |
| B. L. Post's Sons | Claysville | Washington |
| S. S. Blyholder | Neale | Armstrong |

### YORKSHIRES.

| | | |
|---|---|---|
| V. W. Johnston | Clymer | Tioga |

### ESSEX.

| | | |
|---|---|---|
| H. C. & M. R. Elder | Darlington | Beaver |

## SHEEP.

### DORSETS.

| Name | Postoffice | County |
|---|---|---|
| F. C. Bosler | Carlisle | Cumberland |
| J. L. Henderson & Son | Washington | Wash. |
| Dr. W. L. McCleary | Washington | Wash. |
| Henry Palmer | Avondale | Chester |
| J. B. Wylie | Washington | Washington |
| R. W. McKee | Lewistown | Mifflin |
| M. A. Cooper | Washington | Washington |
| A. S. Eagleson | Washington | Washington |

### SHROPSHIRES.

| | | |
|---|---|---|
| J. C. Bebout | Canonsburg | Washington |
| J. I. Barley | Baker's Summit | Bedford |
| W. C. Black | Mercer | Mercer |
| H. C. & M. R. Elder | Darlington | Beaver |
| W. F. Gable | Altoona | Blair |
| J. F. Lantz & Co. | Glenmoore | Chester |
| W. A. Lothers | Lack | Juniata |
| S. Shaffer | Princeton | Lawrence |
| V. W. Johnston | Clymer | Tioga |
| B. L. Post's Sons | Claysville | Washington |
| A. T. Replogle | Waterside | Bedford |
| Edward Walter | Westchester | Chester |

### LEICESTERS.

| | | |
|---|---|---|
| W. A. McCoy & Sons | Mercer | Mercer |

### LINCOLNS.

| | | |
|---|---|---|
| T. M. Shively | Mifflinburg | Union |
| Edward Walter | West Chester | Chester |
| B. W. McKeehan | Mt. Rock | Cumberland |

### SOUTHDOWNS.

| | | |
|---|---|---|
| J. Grier Dain | Malvern | Chester |
| W. A. McCoy & Sons | Mercer | Mercer |
| R. W. Crothers & Son | Taylorstown | Wash. |
| W. M. Benninger | Benningers | Northampton |
| Edward Walter | Westchester | Chester |

### SPANISH MERINOS.

| | | |
|---|---|---|
| Jas. Lindsay & Sons | Utica | Venango |
| R. C. Vance | Burgettstown | Washington |

### BLACKTOP SPANISH MERINOS.

| | | |
|---|---|---|
| John M. Berry | Wylandville | Washington |
| Wm. Berry | Washington | Washington |
| R. P. Berry | Washington | Washington |
| Dr. W. L. McCleary | Washington | Washington |
| R. L. Munce | Canonsburg | Washington |
| J. D. Smith | Castile | Greene |
| R. W. Crothers & Son | Taylorstown | Wash. |

### DELAINE MERINOS.

E. B. Boyle........Canonsburg..Washington
Lee R. Scott......Burgettstown.......Wash.

### NATIONAL DELAINES.

J. B. Wylie..........Washington......Wash.
R. W. Crothers & Son.Taylorstown....Wash.

### OXFORDS.

E. M. Campbell..Leech's Corners....Mercer
A. G. Shaffer.....Rural Valley...Armstrong
A. S. Worden.....Ulysses.............Potter

### HAMPSHIRES.

Jas. Blair .........Hartstown......Crawford
W. J. Monroe....Greensburg........Westm'd
Edward Walter .......Westchester..Chester

### COTSWOLDS.

S. V. McDowell & Sons.Fredonia......Mercer

### ANGORA GOATS.

W. F. Gable.........Altoona...........Blair

## POULTRY.

### PLYMOUTH ROCKS.

Name Postoffice County
N. O. Brownlee (B)..Claysville........Wash.
H. C. Bughman (W)..Pittsburg...Allegheny
Burns & Adams.....Imperial......Allegheny
J. Grier Dain (B)..Malvern..........Chester
Eagley Bros. (B & W).N. Springfield....Erie
H. C.&M. R. Elder (B)..Darlington..Beaver
J. Wolf Evans (Buff)..Spring Mills...Center
Geo. H. Fowler....Stoneboro.........Mercer
W. F. Gable (B & W). Altoona.........Blair
L. D. Harrington....N. Water Gap..Monroe
C. W. Henry....Chestnut Hill..Philadelphia
W. F. Holtzer (B.)..Greensburg....Westm'd
Edwin Johnson (B)..Dolington........Bucks
T.F. Jager.ExmoorFarms, Lebanon.Lebanon
L. K. King......Westfield..............Tioga
H. M. Lyon&Sons(B&W).Wyalusing.Bradf'd
J. F. Lantz & Co....Glenmoore......Chester
L. W. Lighty (B.)..East Berlin.......Adams
W. F. McSparran (B.).Furniss....Lancaster
W. A. McCoy & Sons (W).Mercer.....Mercer
E. Michener (W.)..Michener..........Bucks
W. J. Monroe (B.).Greensburg.....Westm'd
A. S. Morrow......Plumville..........Indiana
Pa. State College....State College....Center
N.Poorbaugh (B&W), Mt..Pleasant, Westm'd
Ridge Farm (W.)..Aldenville.........Wayne
R. F. Shannon (B) Edgeworth Sta..Allegheny
M. P. Shoemaker&Bro.(W) Greensb'g Westm
J. R. Truxal..Greensburg...........Westm'd
A. P. Warren (B&Buff) Elizabeth, Allegheny
Shook Bros. (B&W), Spring Mills....Center
T. M. McKee (B.)..Lewistown........Mifflin
D. N. App (B&W), Selins Grove......Snyder
W. A. Lothers (B.)..Lack...........Juniata
Jos. T. Fleming....Belleville..........Mifflin
J. L. Stouffer......Southwest.......Westm'd
J. H. Peachey (B.)..Belleville........Mifflin
A. T. Replogle (B.)..Waterside......Bedford
Jas. H. Cowan.....Duquesne......Allegheny
A. S. Eagleson (B.)..Washington.....Wash.
W. H. Gray (Buff)..Brookville.....Jefferson

### LEGHORNS.

G. S. Barnhart Buff)..Greensburg..Westm'd
H. C. Bughman (SCW), Pittsburg..Allegheny
H. C.&M. R. Elder (B&W), Darlington, Beaver
J. Wolf Evans (SCB&SCW), Spring Mills C'r
Wm. F. Gable (W.)..Altoona...........Blair
J. Wolf Evans (W&B). Spring Mills..Center
L. D. Harrington..N. Water Gap.....Monroe
R. S. Hartley (B&Br), Dugall........Warren
T. F. Jager, ExmoorFarms, Lebanon Lebanon
J. M. Main&Sons (SCW), Shippensb'g C'b'l'd
R. L. Munce (Br)..Canonsburg........Wash.
Shook Bros. (B&W), Spring Mills.....Center
Pa. State College (Br.) State College..Center
Henry H. Phillips (W), Pittsburg..Allegheny
R. F. Shannon (B&W) Edgeworth Sta.All'y
Geo. G. Strosnider(Br) ..Cummins ..Greene
M.P.Shoemaker&Bro.(Br) Greensb'g Westm'd
J. E. Woodmansee (W) Lake Como..Wayne
A. P. Warren (Buff), Elizabeth....Allegheny
N. Poorbaugh (SCW) Mt. Pleasant, Westm'd
J. B. Kepple (Br), Greensburg.....Westm'd
W. H. Gray (SCW)..Brookville....Jefferson
A. S. Eagleson (Wh.)..Washington...Wash.

### BANTAMS.

H. C. Bughman....Pittsburg......Allegheny
W. A. McCoy (WhG)..Mercer........Mercer
R. F. Shannon (BBRGame), Edgeworth Sta.
...... ......................Allegheny
Shook Bros. .........Spring Mills.....Center

### BRAHMAS.

B. E. Ferris (Lt)....Hector...........Potter
Wm. F. Gable (Lt)..Altoona...........Blair
Pa. State College (Lt)..State College..Center
R. F. Shannon (Dark)Edgeworth Sta..All'y

### COCHINS.

W. F. Gable (Buff)..Altoona...........Blair
J. M. Berry (W), Wylandville.........Wash.
Pa. State College (Lt).State College..Center
R.F.Shannon (Lt&Dk).Edgeworth Sta.All'y

### MINORCAS.

R. S. Hartley........Dugall...........Warren
Wm. F. Gable........Altoona..........Blair
C. W. Henry.. Chestnut Hill (Phila)..Phila.
Pa. State College (Blk) State College..Center
R.F.Shannon(Blk), Edgeworth Sta Allegheny
Thos. Turnbull, Jr..Allegheny.....Allegheny

### POLISH.

Pa. State College..State College......Center

### RHODE ISLAND REDS.

Chas. W. Henry..Chestnut Hill.Philadelphia
Pa. State College..State College......Center
Miller Bros. ....:......Stonybrook.....York

### WHITE WONDERS.

T. M. Shively..Mifflinburg.............Union

### GAMES.

Pa. State College..State College......Center
H. M. Phillips (BB)..Pittsburg....Allegheny
R. F. Shannon..Edgeworth Sta....Allegheny

### FAVEROLLES.

Pa. State College..State College......Center

### WYANDOTTES.

T. E. Orr (All Varieties)..Beaver.....Beaver
Pa. State College......State College..Center
T. F. Jager, Exmoor Farms, Lebanon, ..Leb.
L. D. Harrington..N. Water Gap....Monroe
Bayard Bros. (Wh)...Waynesburg....Greene
Wm. F. Gable......Altoona............Blair
Julius LeMoyne (Wh)..Washington...Wash.
C. C. Townsend (5var.).West Chester.Chester
Ezra Michener .....Michener..........Bucks
Shook Bros. (W&Sil) Spring Mills....Center
F. E. Traver (Buff)..Wyebrook......Chester
R. W. Crothers & Son..Taylorstown..Wash.
N. Poorbaugh (W)..Mt. Pleasant..Westm'd
Pa. State College..State College......Center
R. F. Shannon..Edgeworth Sta....Allegheny
B.L. Post's Sons.Claysville......Washington
A. G. Shaffer (Sil.)..Rural Valley.Armstrong

### HAMBURGS.

Shook Bros. ......Spring Mills........Center
V. W. Johnston....Clymer............Tioga

### BUFF ORPINGTONS.

T. E. Orr............Beaver...........Beaver
W. A. McCoy & Sons..Mercer........Mercer
R. F. Shannon..Edgeworth Sta....Allegheny

### TURKEYS.

H. C. & M. R. Elder (Br).Darlington.Beaver
T. M. Shively (WHol).Mifflinburg......Union
B. L. Post's Sons (MB) Claysville.....Wash.
T. F. Jager, Exmoor Farms, Lebanon Lebanon
J. M. Berry (WHol) Wylandville.....Wash.
W. A. McCoy&Sons (WHol).Mercer..Mercer
J. L. McGough (Buff) Dinsmore.......Wash.
A. G. Shaffer....Rural Valley.....Armstrong
J. R. Truxal....Greensburg.........Westm'd
L. K. King (WHol)..Westfield.........Tioga
R. W. Crothers&Son (WH) Taylorstown.Wash
D. N. App (WHol)..Selinsgrove......Snyder
W. A. Lothers (WHol)..Lack........Juniata
J. L. Stouffer......Southwest.......Westm'd
W. H. Gray (MB)..Brookville......Jefferson

### WHITE-TIPPED BLACK SPANISH.

Pa. State College....State College....Center

### DUCKS.

Edwin Johnson (Pekin).Dolington.....Bucks
T. F. Jager, Exmoor Farms, Lebanon, Lebanon
W. A. McCoy&Sons (Pekin).Mercer..Mercer
J. F. Lantz&Co. (Pekin).Glenmoore.Chester
Shook Bros. (P&R) Spring Mills......Center
W. H. Gray (Pekin)..Brookville...Jefferson

### GUINEAS.

W. A. McCoy&Sons (W).Mercer.....Mercer

### GEESE.

T. F. Jager, ExmoorFarms, Lebanon Lebanon
W. A. McCoy&Sons (WChi).Mercer..Mercer
Shook Bros. (WChi).Spring Mills......Center

### PEAFOWLS.

W. A. McCoy&Sons.Mercer...........Mercer
V. W. Johnston..Clymer..............Tioga

### PIGEONS.

W. A. McCoy&Sons (WFan).Mercer..Mercer

## PETS.

### BELGIAN HARES.

Name Postoffice County
H. C. Bughman....Pittsburg......Allegheny
Eagley Bros.....North Springfield.......Erie
W. J. Monroe....Greensburg.......Westm'd

### DOGS.

Name Postoffice County
J. F. Lantz&Co. (Beagles) Glenmoore Chester
J. M. Main&Sons (Irish Setters) Shippensb'g
......................Cumberland
T. Turnbull, Jr. (Bull Terriers) Allegheny Al.

### COLLIES.

J. Grier Dain......Malvern...........Chester
T. F. Jager, Exmoor Farms, Lebanon Lebanon
T. E. Orr..........Beaver............Beaver
H. M. Lyon&Sons..Spring Hill.....Bradford
B. L. Post's Sons..Claysville....Washington
L ~~D.~~ L. Stevens......Elkdale.....Susquehanna
Edward Walter ..West Chester.....Chester
B. W. McKeehan..Mt. Rock.....Cumberland
W. A. Lothers......Lack............Juniata
H. M. Lyon&Sons..Wyalusing......Bradford
M. A. Cooper....Washington.....Washington
✓ ~~T.~~ M. McKee....Lewistown...........Mifflin
W. H. Gray......Brookville........Jefferson

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solve the Blower problem. They successfully elevate ensilage into silos up to any height, as demonstrated by abundant proof in 1903 catalogue. **10** and **12** H. P. Engines drive Nos. 13, 16, 18 and 19 Cutters with blowers, and all other sizes "Ohio" Ensilage Cutters. In **capacity** "Ohio" Cutters lead; 10 to 30 tons per hour.
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**Herd Bull Mayorford 9560**

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**Champion Medium 2:22¼**
Sire of Que Allen 2:08 2-5,
**Savanna Maid 2:14,**
**May Allen 2:09¾,**
and others.

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***HAS IMITATORS BUT NO COMPETITORS!***

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The year 1904 opens with an unprecedented victory. At the Great Percheron Show held under the auspices of the *Societe Hippique Percheronne de France*, held at La Ferte Bernard, June 16th to 19th, we won First, Second, Third and Fourth in every Stallion class with two exceptions, and First in Collection. At the Great Annual Show of France, held under the auspices of the French Government at Le Mans, June 21st to 26th, our Stallions won First, Second, Third and Fourth in every stallion class without exception and First in Collection.

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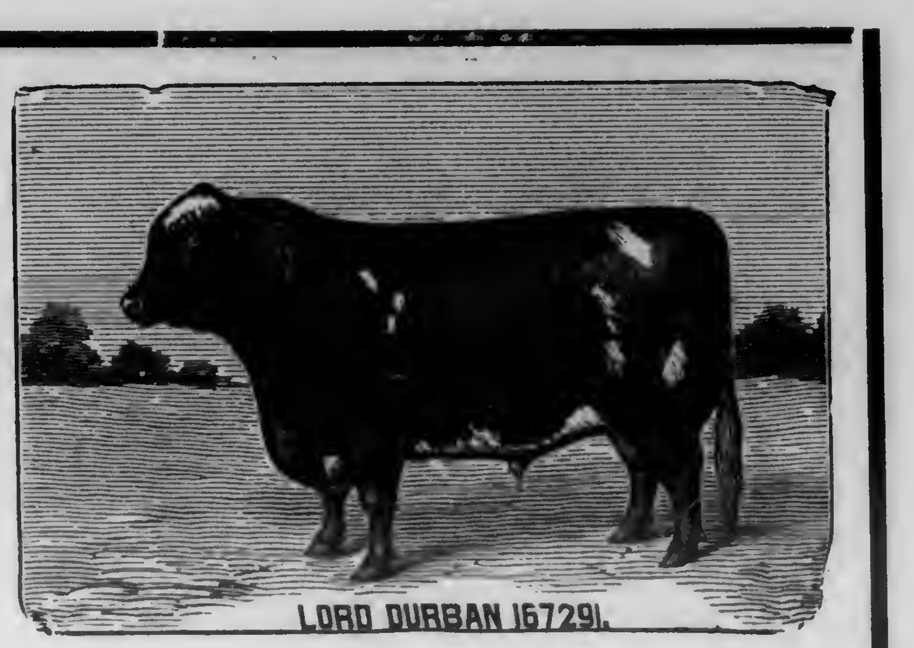

LORD DURBAN 167291.

Our Polled Durhams are pure Shorthorns bred hornless. Herd headed by the Scotch Topped Bull Lord Durban No. 167291, whose weight at three years old is 2,000 pounds. Lord Durban is of true Scotch type and a typical beef animal. Sired by the great Golden Gauntlet No. 128003, the undefeated Polled Durham bull at all the big shows.

The herd represents the following families: Young Phyllisses, Brawith Buds, Red Roses, Rubys, Desdemonas, Blossoms, Young Marys, Amelias, etc. All double standards and recorded in both Shorthorn and Polled Durham herd books. The herd now numbers over forty head, and is the only herd of Registered Double Standard Polled Durhams in Westmoreland County. Young stock sired by Lord Durban for sale. Inspection of herd invited. Visitors made welcome. Correspondence solicited.

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Farm three and a half miles northeast of West Newton, B. & O. R., and one and a half miles south of Herminia, P. R. R.

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**Quart FREE** to those naming **imitation** they have used, and promising to pay express. To these will send Sprayer for 60c.

**BUGOLEUM** *is the most effectual* **SHEEP DIP**

Kills all **Lice, Ticks.** Cures **Scab, Mange, sores.** The best known disinfectant. Prevents contagious *abortion.* Price $1.25 per gal. Add from 20 to 100 gals. water. Cattle dipped or sprayed in **Bugoleum** (1 to 30) will be free of ticks and pass the quarantine.

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Experience has proven Shoo-Fly to be O. K.—*EDITOR.*

Brandamore, Chester Co., Pa.,
July 28, 1903.

SHOO-FLY MFG. CO.,

Gentlemen:—Please send me another ten gallons of "Shoo-Fly." I find after several years' use it is indispensable in running a dairy successfully. I have tested several imitations, NONE like the original and genuine "Shoo-Fly," made in Philadelphia, Pa. When flies are at their worst, my cows feed quietly all day, after spraying a small amount of "Shoo-Fly." My neighbor's cows are in constant torment, fighting flies with head, tail and feet; consequently they lose much milk and flesh, while my cows retain both at cost of half cent's worth of "Shoo-Fly," it being the best investment I ever made. "Shoo-Fly" will cure mange or itch on cattle and keep them and poultry free of vermin. Nothing better than "Shoo-Fly" to drive weevil from grain in barns.

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Ex-Pres. of Penn'a Dairy Union.

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Herd headed by a son of Imp. **GOLDEN ROMULUS.**

## 50 Head in Herd

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Golden Lad Merrigold 58503 and Golden Lad of Riverbrook 62124, 43 3-4 per cent. Golden Lad at head of herd. Young animals of either sex for sale at all times. Exile of St. Lambert 13657, Sire of 98 tested daughters. Choice table Butter a specialty. Agents for

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**The Champion Nosegay Bull Encouragement 46382, at Head of Herd.**

Cows bred and young stock representing the most fashionable families, combined with the "Market Topping" quality for sale.

**Corespondence and Inspection Invited.**

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West Side Rose, Queen Mother and Mina Families for sale.

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ALSO WHITE P. ROCK CHICKENS.

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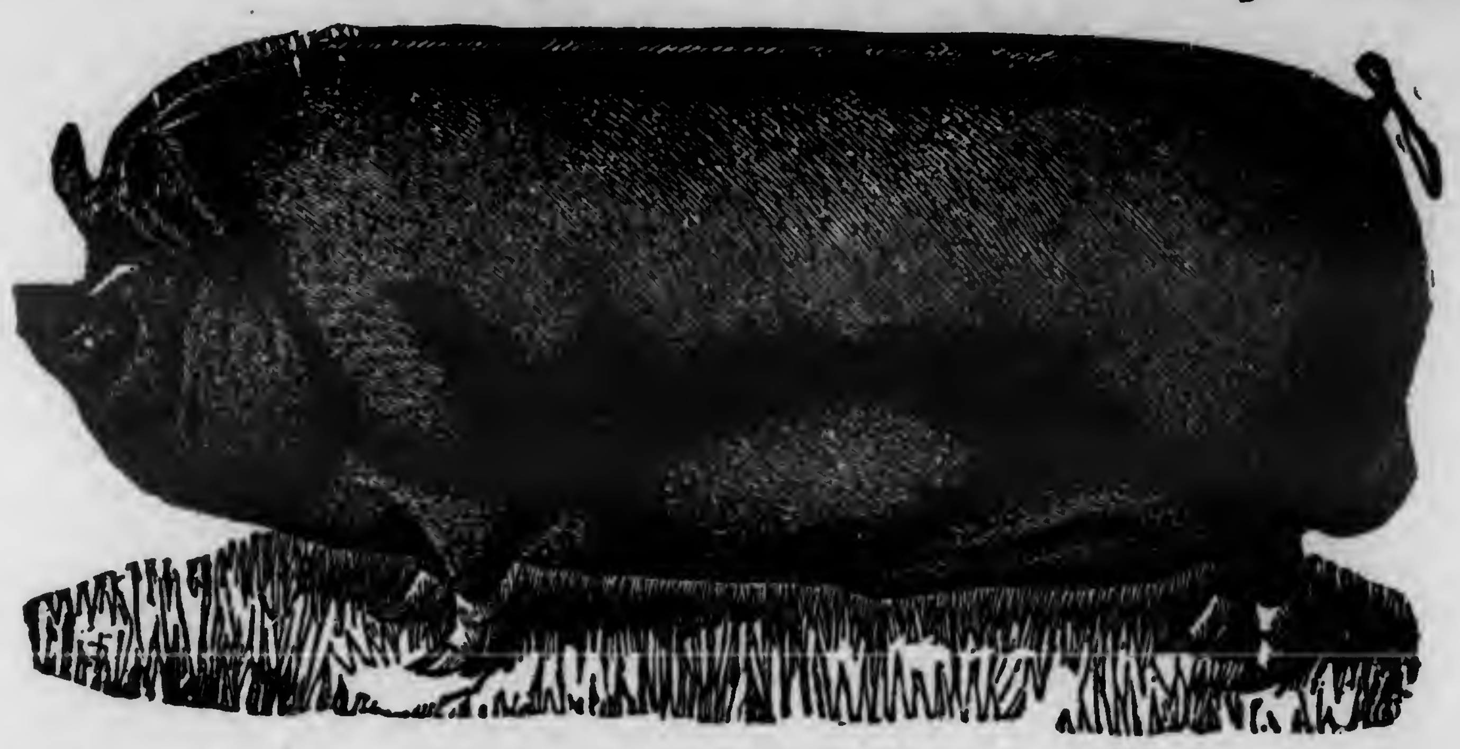

Herd headed by **VICTOR'S BACHELOR** he by **IMPORTED LUSTRE'S BACHELOR 52262**, the great prize winner bred by I. N. Barker & Son, Indiana. Dam **VICTOR MAUD 56689.** Bred by W. G. Riley & Son.

No. 2 **DURHAM'S ACROBAT** sired by Sambo. Weight 1,100 pounds. Dam's weight 800 pounds. Both great Canadian prize winners.

## Some of Leading Herd Sows.

Orchard Grove Queen by Victor Hugo out of Lill Kings Sister. Groves Model, sire Orphan Boy, dam Rosa Lee. Bred by Roberts Bros., Ohio.

Stones English Lass by Imported Lord Oxford, out of Imported Broad Belle; Colubia's Queen, Black Belle, Orchard Grove Queen II, Victor's Beauty. These are my leading sows. All good strong breeders.

Cross on above boars gives you some of the best blood in America.

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Headed by Marine's College Boy 9257, by Selectrician's College Boy, owned by State College.

Cows are of equal breeding; young stock for sale. A few six months Bull Calves at present.

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Edgeworth Station, Allegheny County, Pa.
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Registered A. J. C. C. Jersey Cattle

BERKSHIRE HOGS.

MILK. BUTTER. QUALITY.

R. F. SHANNON,

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JERSEYS

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ANGUS

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Registered Angus Cattle.

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Stock for the show and for the Farmer's herd.
Also high class **Hampshire Sheep,** both sexes, for sale.

Correspondence and inspection invited.

JAMES BLAIR, HARTSTOWN, PA.
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Clovers, Timothy, Blue Grass,
Orchard Grass,
Red Top, Ensilage Corn, Cow Peas,
Millet, Rape, Sorghum,
Seed Wheat, Seed Corn, Seed Rye,
Seed Oats, Seed Barley,
Kaffir Corn, Spring Vetches,
Hungarian Grass,
Buckwheat,
Fertilizers, Wood Ashes, Oil Meal,
Seed Potatoes.
Blatchford's Calf Meal,
Blatchford's Sugar and Flaxseed,
Retsof Lump Rock Salt,

Ohio Ensilage and Fodder Cutters and Shredders,
Corn Huskers and Shredders,
Bowsher Belt Power Grinding Mills,
Victor Horse Power Grinding Mills,
French Burr Grinding Mills,
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# END OF YEAR

Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1905

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1905

Master Negative Storage Number: MNS# PSt SNPaAg057.4

# 1905

THE PENNSYLVANIA STATE COLLEGE
AGRICULTURAL EXPERIMENT STATION
STATE COLLEGE, CENTRE CO., PA.

BULLETIN NO. 11. OF

# THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION.

PROCEEDINGS AND PAPERS OF THE

## SIXTH ANNUAL MEETING.

HELD AT

HARRISBURG, JANUARY 25-26, 1905.

F. D. BARNHART, President.
E. M. BAIR, Vice President.
D. B. FISHER, Treasurer.

W. F. HOLTZER, Secretary,
R. F. D. No. 1.
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White and Buff Plymouth Rocks and White Holland Turkeys of Large Strains

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# PROCEEDINGS AND PAPERS

OF

# SIXTH ANNUAL MEETING

OF

# The Pennsylvania Live Stock Breeders' . . . Association

HELD AT

Harrisburg, January 25-26, 1905.

## OFFICERS:

| | |
|---|---|
| President | W. C. NORTON, Aldenville |
| First Vice-President | DR. LEONARD PEARSON, Harrisburg |
| Second Vice-President | M. P. SHOEMAKER, Greensburg |
| Secretary | E. S. BAYARD, East End, Pittsburg |
| Treasurer | J. F. LANTZ, Glenmoore |

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Pittsburg, Pa.

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# PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

## Proceedings of the Sixth Annual Meeting

held at

HARRISBURG, IN BOARD OF TRADE ROOMS

January 25 and 26, 1905

## PREFACE

The Report of the Sixth Annual Meeting of the Pennsylvania Live Stock Breeders' Association is presented on the following pages. The lengthy discussion of the State Fair Bill on the evening of the 25th is omitted, since the bill which was prepared with so much care by our Association died in in Committee. Nevertheless we are farther along with this work than ever before, and full of hope for another trial of our strength. The thanks of the Association are due Hon. L. O. McLane, of Crawford county, who introduced and worked for the bill; and to President Norton and others who used their influence to further it. Another bill will be prepared and presented to the next legislature in the hope of more favorable action.

I desire especially to call attention to the excellence of the addresses at this short convention, which began the evening of the 25th and closed the 26th.

The Secretary of Agriculture, Hon. N. B. Critchfield, aided the Association in every possible way, and I desire to thank him for many favors received at his hands. He is using some of this report in his official report. The list of breeders has been revised with great care, two letters having been addressed to each delinquent before his name was stricken off. It is to be hoped that a larger list will appear in our next report.

E. S. BAYARD, Secretary.

Convention called to order by President Norton at 7.55 P. M.

President Norton: The first thing on the program is the address of the President. I think we will lay that aside for the present. I am sorry the weather* is such that a great many from the outlying districts cannot be here. We have a good program for to-morrow. We want you to stay with us and help us during the meeting.

We will now listen to the report of the treasurer.

Mr. Lantz:

*Note.—A terrible blizzard was raging which caused the Pennsylvania Railroad to stop all traffic and quarter through passengers at hotels in Harrisburg. Some of our members did not reach Harrisburg until the convention had adjourned.

Mr. President and Gentlemen of The Pennsylvania Live Stock Breeders' Association: Following is your treasurer's report of receipts and expenditures, since the last annual meeting held at Pittsburg, February 10th, 1904, to date:

**Receipts.**

| | | |
|---|---|---|
| Balance on hand at last annual meeting | $ 3.98 | |
| Appropriation from Department of Agriculture | 150.00 | |
| Receipts from Advertisements in Annual Report | 75.00 | |
| Annual Dues | 100.00 | |
| Total income | | $328.93 |

### Expenditures.

| | | |
|---|---|---|
| Expense of lecturers at last annual meeting | $121.30 | |
| Secretary's expenses | 28.91 | |
| Treasurer's expenses | 17.20 | |
| Stenographer's bill | 40.00 | |
| Publication of Annual Report | 93.57 | |
| Total expense | | $300.98 |
| Balance cash in the treasury | | $ 27.95 |

Now, gentlemen I must come at you with the same old story that our receipts are not enough to pay our necessary expenses. I presume you are tired hearing me telling you this, but if you don't want to hear it any more you must elect another treasurer. It is true we got out the report, but who did it, and how was it done? No job printer would do the work for the amount of cash we had on hand to pay for it, and not wanting to run the association in debt, The National Stockman and Farmer, in order to help us out, agreed to take the $93.57, the amount we had on hand, and do the balance for nothing. Last year the same number of copies cost us $133.45 and that bid was lower than the lowest of any of the Pittsburg jobbers; this year the Report is larger and better, and would have cost $150.00 from any other publisher, and your Secretary had to ask The National Stockman and Farmer people to do it for $93.57 and they did it. I move that a vote of thanks be extended by this association to Mr. Bayard, and The National Stockman and Farmer of Pittsburg, for this service.

[Carried.]

Audited January 26, 1905, by committee and found correct as reported.

M. P. SHOEMAKER,
GEORGE ERK,
HENRY PALMER,
Auditors.

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The President: We will now have the report of the secretary, Mr. Bayard, of Pittsburgh.

Mr. Bayard: My report is all printed here and has been distributed. I have little to add except to say that I have written hundreds of letters and sent out many circulars. This meeting has been advertised in some 300 papers in the State of Pennsylvania, and I think all of the breeders of the State have had a chance to know of it.

The President: We want your moral support; we also want your dollar and cent support. There are a great many in this audience who are not members of this association that I know are interested in breeding. We want your support. Join the association. Our treasurer, Mr. Lantz, is here, and he will be glad to receive your money at any time.

The first speaker of the evening is Mr. J. C. Duncan, of Lewiston, New York, "The Profitable Sheep."

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## THE PROFITABLE SHEEP

"The title of this subject embraces a wide latitude of questions. Every breeder interested in any of the improved mutton or fine wool breeds will advocate the breed he is directly interested in as being the most profitable sheep. And this must be conceded to a certain extent, as certainly no breeder of the present day would engage in and continue in breeding a sheep that was unprofitable to him as a business. So we will not take up the point of which is the most profitable breed, but for a moment discuss the profitable sheep. In my experience in feeding both cattle and sheep, I have always found I could produce mutton much cheaper than I could produce beef, for the amount of food consumed. Notwithstanding this fact, high class lamb and mutton usually sells at a higher market value than beef of the same grade. But allowing them to sells for the same price pound for pound, we have still a handsome balance in favor of the profitable sheep. from the revenue of from the fleece of wool, which usually amounts to from $2.00 to $3.00 per head, in the average mutton breeds kept on the farm principally for butchers' lambs, and considering the very limited amount of care they require, these are some of the facts we must credit to the profitable sheep.

### Two Incomes.

It is an all-important fact in every branch of industry to consider the source of income, and as related above, sheep usually afford two annual incomes, namely, lambs and wool. But to keep in touch with our subject, the profitable sheep, we might first consider it in a pure bred standard flock, the progeny of which is usually sold to small breeders and farmers who make a business of producing butchers' sheep. We must start on sound fundamental principles, that of breeding an animal that will produce the largest amount of valuable meat for a given quantity of food, with the smallest amount of waste to the consumer. These should be the governing facts in the breeding of all animals for the production of high class meat, which must end up with the final test on the block, where the profit is calculated in dollars and cents. Now, to breed a profitable pure bred sheep, if our aim be to breed the highest class of sires of any of the approved breeds for use on the standard flocks of the country, we must have an ideal equal to what we expect to attain. And in forming this ideal: First, it is absolutely necessary to have a healthy, vigorous animal showing a strong constitution, as we must always bear in mind that the constitution of any animal in the foundation of all improvement. If we have an animal with all the fancy and fantastic points of our ideals with a poor constitution, what profit can we expect from the progeny of such animals? In the case of a sire it would prove utter ruin to a whole flock to tolerate any such animal in our flocks and herds.

Therefore, if we wish to make a name for ourselves as breeders of high class, profitable sires, we must see that we never lose sight of the utility parts of the kind of animals we are interested in. Hence I would urge all breeders of high class sires expected to reproduce and improve our standard flocks to guard against being carried away by the fancy points instead of the utility parts, as the latter are essential in the line of improvement to make profitable sheep.

But to make a profitable sheep we must demore than get a sheep of superior breeding and constitutional vigor. In conjunction with the above it must be properly cared for from birth until it is either sold as a sire to head a pure bred flock, or to the butcher for consumption as meat. The care of that animal should be so that it is developed in as rapid a way as nature has provided in order that the development may be done with the least possible waste. This means the most generous and judicious feeding and care carried out in every part of the system. As any breeder of experience knows, with insufficient feeding and poor care a flock will very soon lose their vigor and degenerate. So that the more rapid growth means not only about one-third less cost in the production of our animals, but animals produced in this way are produced at a less cost for feed and are generally worth more pound for pound on the market. This is a decided encouragement for good feeding and early maturity to make a profitable sheep. The even, healthy, rapid development of the young animals is the great thing to be sought for in profitable sheep as in every other class of live stock feeding which is to fit animals for the consumer of meat foods of the present day It is the tender, juicy, high flavored mutton that tempts the appetite and fills our desires for that class of food, so that the matter of early maturity is of the utmost importance in the production of high class meat to make the profitable sheep. These are some of the things we must bear in mind in the production of high class animals for consumption as meat.

The question will now arise will it pay the average farmer and breeder of this class of stock? It has been my experience both in breeding high class pure bred sheep, also in growing sheep in a commercial way, that the best I could produce was always the most profitable sheep. The market is always good for meritorious animals either in breeding flocks or in case of lamb and mutton to supply hotels and restaurants in our large cities where the demand is far in excess of the supply.

There is no animal on the farm to-day that will give us more clear meat for the amount of food consumed and the work required to take care of it than the sheep. You can take the latest Buffalo market, fat lambs sold for $7.75 and as high as $8.00 per cwt. I do not see why each and every one of our farmers does not keep a few sheep to eat up the waste both in the summer and winter. Sheep are not expensive. If you have some roots for them, ensilage, corn or something like that they get along very well. I have seen sheep fed by the thousand on nothing but clear roots. Of course we could not feed sheep alone on that in this country. In my country we have a different climate, and we can feed sheep with much less expense than here. There certainly is a demand for that class of meat fitted up in the highest possible shape. Even for the prize stock that is produced for our large shows throughout the country there is a demand; in the largest cities the supply is not equal to the demand. There were a great many sheep that were shown at Chicago and over in Canada, and every one of those found their way either to Boston or New York, to be used by those large clubs there. If I were to tell you the price that some of those animals sold for you would hardly believe me. I know one man who sold to a club house in Boston and a hotel in New York fifty yearling wethers at an average price of twenty cents a pound dressed weight. If we can keep any animal on our farm to-day that will net us as much profit as this I would like to know what it is. I would like to have some of them.

### Discussion.

What would be the live weight of those yearlings—about ten cents a pound?

Mr. Duncan: Yes, probably twelve. A yearling wether will dress about 60 to 62 pounds.

Q. Wouldn't do it on rye straw?

Mr. Duncan: No. You can keep a flock of breeding ewes through the winter on mangel wurzels, corn fodder and oats straw, any kind of hay. They are very easy to keep.

Mr. Lovejoy: We have a Dutchman out in Illinois who said he fed them on straw, but when pinned down said it was not very well thrashed.

Mr. Duncan: There are too many of our farmers who have few sheep. They say it don't pay well. They can't pay under the circumstances in the way they are kept. I know a farmer who lived near me who kept probably twenty or thirty sheep. He put them in the far end of the field and once or twice during the summer looked at them. We cannot expect to make money out of an animal in that way. In the winter take them up and let them run around the straw stack. For the pure bred flock we must keep them growing from the time they are born until the time we turn them off. You take a lot of lambs and feed them with clover hay and corn and they will develop in a way that will do very well for the market.

Q. How will ensilage do?

Mr. Duncan: It does very well, but it is not as good as roots. It does very well as a variety to help along. The more variety the sheep has the better it will do.

Q. Ensilage is less expensive than the roots, is it not?

Mr. Duncan: Yes, sir.

Mr. Lovejoy: In our part of the country we cannot get labor. The average western farmer will not get down on his knees and do the work necessary for roots.

Mr. Duncan: You do not have to get down on your knees. Take a hoe with a long handle.

Mr. Lovejoy: I raised a few sugar beets, but I got over that.

Mr. Duncan: It is a good thing to raise stock with. There is no question about that, especially in breeding animals. I never found anything that I could keep up the vigor and constitution and develop young stock as well as with roots.

Q. What breed of sheep do you consider most profitable?

Mr. Duncan: Well, of course that is a question I might be a little prejudiced about. You know I breed the Shropshires, but they are all good. If you have some other kind, some other variety, they will do just as well as the Shropshire if you take the same care; you will make just as much money out of them as I do out of the Shropshires.

Q. Just depends upon what you want them for?

Mr. Duncan: Yes.

Q. What per cent. of increase do you get?

Mr. Duncan: About 150 per cent.

Q. Do you mean you produce 150 per cent. or raise 150 per cent.?

Mr. Duncan: We drop more than that; we generally develop about 150 per cent.

Q. Lambing time is the time that requires the most care?

Mr. Duncan: I find one man can take care of about 25 ewes all right.

Q. What do the fleeces average on your Shropshires?

Mr. Duncan: I have sheared 17¾ pounds. The average will be probably ten pounds. We do not like to go below that for our Shropshires.

Q. What is the nature of the grass?

Mr. Duncan: When we seed down our pasture land we make a variety. We put in timothy, clover, alsike, fescue and orchard grass. We think we get a better sod when we seed down our meadows than with single plants, such as clover and timothy. They seem to last better; sheep do not seem to eat them so short.

Q. If you had a flock of breeding ewes about what weight would they average?

Mr. Duncan: 175 pounds in average breeding condition. That is, provided we have matured ewes, not young ewes.

Q. You mean breeding stock?

Mr. Duncan: Yes.

Q. Do you like a blocky type of Shropshires?

Mr. Duncan: Yes, I prefer one not too long.

Q. Isn't that the type which is more popular to-day?

A. Possibly.

Q. What will your wethers weigh?

Mr. Duncan: Will average about 175 pounds; some will weigh 250 pounds; 175 would be a fair average, very seldom go below that.

Q. At what age do you kill your wethers?

Mr. Duncan: Well, they generally drop in March. Something about a year. We never keep our herd over Christmas. It is not profitable to keep them after that; you can't get as much profit pound for pound.

Q. About 21 months?

Mr. Duncan: From eighteen to twenty-one months.

Q. Do you take your grade ewes and a pure bred sire?

Mr. Duncan: That makes a very good butcher lamb, very good wether.

Q. Isn't the Southdown considered the standard mutton sheep?

Mr. Duncan: It is to a certain extent, but I do not think it is the most profitable. A great many people think it takes it takes a whole lot of money to go into the sheep business to pay. You don't need a high class breeding ewe. Take a bunch of common grade ewes and a pure bred mutton sire and you make just as good lambs sometimes as from the pure bred for the butcher.

Q. Don't you consider that sheep are valuable for other purposes on the farm than just for the mutton—to clean up the weeds?

Mr. Duncan: I have a neighbor. One day I said to him, "John, why don't you get some sheep to eat up your weeds?" He said his fences are not good enough. I says, "Why, God bless you, man, you will never have any fences if you don't get the sheep. Get some sheep and the profit of that flock of sheep will pay for your fences." I know this to be a fact.

Q. Will the sheep clean the fence corners unless they are starved to it? I have had a flock of sheep for many years and they always prefer good grass. I want to know if it is necessary to starve them to make them clean up the corners? I want to know how to make my sheep clean up the corners?

Mr. Duncan: Send up to me and I will send down some sheep. (Applause.) There are some weeds sheep will not eat, but as a rule they will not let them go to seed. The only trouble I find is they do not want to eat the Canada thistles close enough. Outside of this I have no trouble unless it is on a run down farm. One year they kept them close, but for the last two or three years they have let them grow again. I do not know why that is.

Q. Can you keep sheep and cows in the pasture land?

Mr. Duncan: You do not need to. I was reading in some agricultural magazine there are 600 varieties of weeds and there are only four that the sheep will not eat. Of course, they will not live on them entirely, but they do keep the farm clean.

Q. How many sheep do you have in flock?

A. We have about 125 in the largest bunch.

Q. Do you keep your lambs in a separate division?

Mr. Duncan: We have a sliding door from the main sheep barn into the lambing pen. There are twenty pens arranged so the doors open on hinges. When the ewe lambs she is put into one of these pens and left for two or three days until she gets acquainted with the lambs and they are strong enough to turn them in with the bunch of ten or twelve. In the course of a few days we get ten or twelve together and they will generally run into the main barn again after that.

Q. Do you have trouble with ewes that won't own their lambs?

Mr. Duncan: Once in a while. We put them into the lambing pen I have just described for a few days until the lamb and the ewe get accustomed to each other.

Q. Do you ever have a ewe own one lamb and not the other?

Mr. Duncan: I take the lamb she will own away and get her accustomed to the other one.

Q. Is there not more profit in lambs when they are about three months old than when they are older than that?

Mr. Duncan: It depends upon what you want to use them for.

Q. Do you practice the English hurdling system?

Mr. Duncan: I do to a certain extent. We do that more with show sheep than with our common herd, our commercial flock. Of course it is hard to do in this country, the ground is so hard. It is a very good plan, especially where you are troubled with stomach worms, to keep your sheep on the clean ground. I do not think the stomach worms have been so bad these last two or three years as they used to be three or four years ago.

Q. In case a man gets strange sheep, buys them, wouldn't it be advisable for him to treat all the sheep for the stomach worm?

Mr. Duncan: It would be a good precaution to take with all sheep, no matter whether stomach worm or not, for all sorts of parasites, lice, ticks, and such as that. I believe it would be well to go over them with the gasoline treatment.

Q. How much gasoline do you use?

Mr. Duncan: Two dessert spoonfuls in a quarter of a pint of milk.

Q. You have spoken entirely of mutton sheep. Is there a place in the East for fine wool sheep?

Mr. Duncan: I have not had much experience with the wool sheep. There seems to be a certain demand for that kind of wool.

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**Note.**—For details as to gasoline treatment see preceding annual report.

# PREVENTION OF TUBERCULOSIS BY VACCINATION

## ADDRESS OF DR. LEONARD PEARSON

For some years the State Live Stock Sanitary Board has been making experiments for the purpose of developing a method for preventing tuberculosis of cattle by vaccination.

This work was commenced nearly five years ago. It was attempted at first on a very small scale, and afterwards when it became evident, about two years ago, that it was possible to increase the resistance of an animal to tuberculosis to a very large degree by a process of vaccination, the experiments were then taken up on a large scale for the purpose of ascertaining whether it might be possible to develop a practical system for vaccinating cattle against this prevalent disease.

The process consists of injecting into the animal the living germs of tuberculosis of a variety that is found to be non-virulent for cattle. There are a great many varieties of the tubercle bacilli, varying in several respects, but chiefly in the degree of their virulence for different species of animals. There are some varieties that are absolutely non-virulent for cattle; that is, they do not have the property of producing disease in cattle in any degree. The special strain of germs that we are using for the vaccination of cattle is one that has been very thoroughly tested; enormous quantities have been injected into cattle with the view of ascertaining whether under any circumstances it might possibly be harmful. It has been found it is impossible by any process that has been used to infect an animal with tuberculosis by the use of this special culture. Of course, there are cultures that are deadly for cattle. The need for precise information on this point is of the very highest importance.

The process of inoculation consists of injecting a suspension of the tubercle bacilli, the tubercle bacilli being mixed up in a solution of common salt. We inject this solution into the circulation; that is, the injection is made into the jugular vein. And at varying intervals the injection is repeated. One of the purposes of our experiment is to ascertain just what dosage is necessary and just what intervals between doses should be employed and just how many doses gives the best results. So you can see that it is necessary to try different experiments on a considerable number of animals for the purpose of gaining information on these points. Another point that it has been necessary to gain information upon is with relation to the duration of the immunity that is produced by this system. Our first experiments showed that by repeating the vaccination several times it was then possible to inoculate the animal with a virulent culture that caused death in a short time in unvaccinated animals, and that the vaccinated animal will resist the inoculation with the virulent culture. When such vaccinated animals were killed some weeks after the inoculation with the virulent germs, it was not possible to find any trace of infection; while in the unvaccinated animals that were inoculated at the same time with the quantity of the same culture, very distinct lesions of tuberculosis were found. Indeed, some of our unprotected animals died within a short time as a result of this inoculation.

### The Cattle in the Experiment.

We have under experiment now about one hundred cattle. These are kept on a farm that has been provided for this purpose by the State Live Stock Sanitary Board in Delaware County. The cattle that are on that farm are of three sorts. There are the vaccinated cattle, the cattle that have been vaccinated in different ways, with different cultures, with different dosage, with different intervals between vaccinations and with different numbers of vaccinations. That is one class of animals. Then there are the unvaccinated cattle which are kept there for the purpose of comparison. Then there is a considerable number of tubercular cows, cows in an advanced stage of tuberculosis. Now, vaccinated cattle and unvaccinated cattle are in constant daily contact with the tubercular cows, the idea being to continue this exposure for a considerable time, for several years indeed, and from time to time to kill the vaccinated and the unvaccinated cattle with the view to ascertain whether the unvaccinated cattle are infected and the vaccinated cattle are protected, and what system of vaccination gives most satisfactory results, so that we may know the system that we may depend upon in actual practice.

We have already proved that by a sufficient number of vaccinations a thoroughly practicable degree of immunity can be afforded, but, of course, the value of the process will depend largely upon the economy with which it can be applied, and so without going below the safety point, we want to know just how few vaccinations will give the result that is desired.

### Favorable Results.

Recently, during the last month, we have killed a number of these experimental cattle. In the last lot destroyed there was six that had been vaccinated and three that were not vaccinated. Of these six that were vaccinated two were vaccinated twice, one was vaccinated four times, one five times, another five times, another six times, and then in another lot, that is, of another series, killed about the same time, one was vaccinated two times. The dose upon the first vaccination was small, the second was larger. Another was vaccinated ten times, the ten vaccinations being made for the purpose of ascertaining whether by repeated vaccination and whether by the use of very large doses any injury would come to the animal. Well, all of these vaccinated animals of this one series and two of the other had been in contact with tubercular cattle for more than a year, and some of them almost two years, and all of them were found to be in condition of absolute health. There was no sign whatever of tuberculosis in any one of these animals. The three controls of one series and the single control of the other series, making four in all, that had been exposed to contact with the tubercular cattle for some length of time were all tubercular, three of them to a very great degree, one of them rather slightly. In the last control there was a good deal of natural resistance and, although it became infected, the disease was not widespread.

Other systems of vaccination with other cultures have not been so successful. I have not the figures here with regard to them, but I don't think they are of special importance because some of the cultures we were using for the other series of vaccinations have now been discarded for this purpose because we found those cultures did not give satisfactory results. So that the general result of the vaccination with certain tested cultures has been satisfactory. The result with other cultures has not been satisfactory. So that it is perfectly evident that a great deal depends on the culture that is used; a great deal depends upon a thoroughness of the treatment with which the vaccinations are made. We are now beginning, on a small scale, to put this system of protection into practical use. We are trying, in our own experimental herds, for instance, the vaccination of calves as they are born; the calves from tubercular cows, the calves from the vaccinated cows, and from unvaccinated cows, are some of them vaccinated by different processes, and others are left without vaccination, with a view of determining whether calves if vaccinated and exposed constantly to disease may be grown in health. We have some cattle now in such an experiment that were born nearly a year ago. We have some a little more than a year old that, so far, appear to have resisted infection, but whether they will wholly resist infection or not can only be determined by the slaughter and the careful post mortem examination of these animals. So that I say that now any attempt to make a report on those cattle would be entirely premature because one cannot safely draw conclusions from their apparent condition during life. We must wait until a post mortem examination has been made.

The use of vaccination in other herds, as I say, has been started. We have begun to vaccinate young cattle in herds, in different places, and some of this work was started some months ago, and, so far, appears to have given very good results. That is to say the cattle have not been injured in the slightest degree by the vaccination. They have grown as well as unvaccinated cattle, they have had no backset. No unthriftiness has been caused by the vaccination. But whether these cattle will be protected as they grow up, it depends upon future investigation to determine.

### Control of Vaccines.

In regard to the general use of vaccines, I think that Mr. Lovejoy brought out an exceedingly important point in his talk to-day. He told you of the prevention of hog cholera by an advertised system of vaccination, which really infected by inoculation and apparently produced the disease in the hogs that it was intended to protect. Vaccination with living organisms is always a very delicate process. We cannot be too particular or take too careful supervision. Evidently the vaccination that was applied to his hogs was made with a living culture of hog cholera bacilli and these bacilli were virulent for hogs and instead of protecting them they produced the disease. In discussing the matter with him last evening, and from the information that he gave me then, as well as

what he said here this morning, from the order of occurrence of disease following the vaccination, it seems there could be no doubt that his hogs were infected by this process that was intended to protect them.

Well, cattle can be infected by tuberculosis by vaccination if the vaccine is not of absolutely perfect quality. And there is danger that vaccines may be put upon the market which are not reliable, which either are too weak and do not protect, or that are too strong, and produce disease. There is already a firm of druggists in New York City that is advertising very widely a vaccine against tuberculosis. It is brought from Germany. They make claims for it for which there is absolutely no foundation. They claim that this vaccine will protect cattle for their entire lives. Nobody knows whether it will protect cattle for their entire lives or not. The work is altogether too new to justify anybody in drawing such a conclusion. During the past summer I had an opportunity to visit all of the foreign investigators who were working along this line. I went abroad for the especial purpose of investigating the subject of vaccination against tuberculosis. I went to nine different countries and visited twenty or more investigators, and saw many animals that had been vaccinated, and I went everywhere that I could hear of any work of this character being done. So I know pretty well upon what the claims as to this German vaccine are based.

The German work has not been carried on as long nor upon such a large scale nor in such a systematic way as the work that has been done in this country. As I have said before, some of the claims for the vaccine that is now advertised are without foundation; and any one who uses it should should use it purely as an experiment; not with the thought that he is sure to gain protection, which those who put it out claim it will give.

I do believe and I am convinced that vaccination against tuberculosis is going to be a practicable process. It may be that the processes that we are now using will be sufficient. Whether they will be or not time alone will determine. But at any rate it can do no harm, and we are disposed to use it on a continually larger scale until we know all about it, or at least enough about it to justify us in recommending it for general application. If it continues to give as favorable results as it so far has given, there can be no doubt that within a year or two it will be used very widely and with great profit.

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# GROWING OUR OWN PROTEIN

### By Prof. E. B. Voorhees, New Jersey Exp. Sta.

### Proceedings of Thursday, January 26, 1905

The meeting was called to order by the president at 9.30.

President Norton: The first paper on the program this morning is by Prof. E. B. Voorhees, entitled "Growing Our Own Protein."

### GROWING PROTEIN.

It is quite natural that for the raising of live-stock, the question of rations should be one of the most important, for next to breeding it is the question upon which success hinges, and we need no better evidence of the necessity of specific knowledge on the part of feeders than is given in the work of the various experiment stations. The investigations that have been conducted show not only the necessity for a broad intelligence in the matter of the preparation of rations, but also that this intelligence must be accompanied by definite information concerning what constitutes a food, and of the functions of the nutrients in the various groups of specific substances.

Twenty years ago animal foods, aside from hay and corn stalks, consisted mainly of cereal grains, or mixtures of them, whose feeding values were well established, together with the mill feeds derived in the manufacture of flour from wheat, rye and buckwheat. The other concentrated feeds on the market at that time, which were used in any considerable quantity, were linseed meal, cottonseed meal, malt sprouts and hominy meal. To-day an examination of the results of feed inspections in the various States, shows that in addition to those used twenty years ago there are now nearly one hundred different kinds, varying widely in their physical character, and in their content and cost of nutritive substances. As a preliminary, therefore, to the discussion of the main topic, I think it well to point out in some detail the situation in reference to food supplies that exists at the present day.

The principles of nutrition are the same today as they were twenty years ago though in the meantime much has been learned concerning the composition of the different groups of nutrients, the preparation of rations, and the specific functions of the nutrients. Neither has the primary object or purpose of feeding changed in this period, though much has been learned concerning the relation of feeds to the production of specific animal products, with the conditions the same in essential particulars; therefore, the question arises, is there any good reason why the whole grains and regular forage crops of the farm should not serve to-day as well as twenty years ago, as the chief source of the nutrients in the rations for farm stock? There is no reason from the standpoint of nutrition, why the whole grains, together with the refuse products, which were available then, should not supply the demands at the present time, and in many respects foods derived directly from home products are superior to rations that may be made up by farmers or dealers from the numerous by-products now on the market.

### Whole Grains Differ from Feed Residues.

Nature has provided one thing in the constitution of the whole grains, which is not possessed by any mixture of other materials consisting of parts of whole grains, namely, uniform and fixed proportions of the pure nutrients, fat, protein and carbohydrates, and which when used with the ordinary roughage makes it difficult to cause injury from even careless methods of feeding. The chief advantage to be derived from the larger number of the different kinds of concentrated feeds at the present time, is that it is possible by means of them to reduce the cost of the ration and to adjust the nutrients more nearly according to what is believed to be the specific needs in the various purposes of feeding. It is more than likely that the use of feed rations, made up of one-third, by weight, of ground corn, ground oats and wheat bran, cannot be improved upon, from the standpoint of total product and effect upon the animal, by the use of rations made from the different kinds of feeds now on the market, and that the increase in the number of products is not due to necessity, but to changes in the manufacturing of the cereals and other farm products, as well as to the increased knowledge concerning the nutritive value of materials not formerly used for animal consumption.

The largest increase in the number and kind of feeds has come from the residues derived in the use of corn in the manufacture of starch and sugar, and the next in order by the increase in the number of residues derived from the manufacture of malt and distilled liquors, and to better methods of handling these refuse products. There has also been a great increase in the number due to the increased production of cottonseed and of flaxseed, and finally to more complete utilization of the refuse products as a result of the manufacture of oat meal from oats.

The character and composition, and frequently the palatability, of these feeds are in a general way determined by the object of the manufacturer of the original grain, whether to take from it one of the important and highly digestible groups of nutrients, and leave the others, or whether he takes the whole of the highly digestible, and leaves the bulky and indigestible, the hull or husk.

In the case of corn, the primary purpose is to remove from it as near as may be, all of the starch that is contained in it, or but one of the nutritive substances. Hence the total refuse product is richer in protein and fat, and poorer in carbohydrates, than the original corn, and thus from the standpoint of the feeder, a pound, or a ton, of the entire refuse would be for feeding purposes, worth more than the original corn, and inasmuch as the fat is corn-fat and the protein is corn-protein, there is no known reason why these actual food compounds should not be and every reason why they should be, quite as nutritious as in the original product.

As already pointed out, however, nature has provided in the whole grain good proportions of the pure nutrients, usually associated with the crude fiber in such a way as to make it a difficult matter to cause injury even from careless methods of feeding, while the manufacturer on the other hand, removes more or less of one of these nutrients, which, therefore, disturbs the proportions of the constituents, and the resultant feed, decidedly unbalanced, must be used more carefully, and with other products, if equally good results are to be obtained.

### Refuse Feeds of Low Value.

There is, however, a class of feeds which have been placed upon the market in recent years, now large in number, and belonging to that class which are not concentrated in the sense that one or more of the highly digestible nutrients are contained in them, and which can not, therefore, be said to have added to the source of supply of desirable products, first, because they do not contain a class of nutrients that the farmer needs to purchase; and second, because the substances themselves are not highly useful. These are derived mainly from the residues in the manufacture of oat meals, and consist not of the richer portions of the grain as protein and fat, but of the poorer portions, the outside hulls, and consisting more largely of crude fiber than the original grain. That is, they contain very low percentages of protein and fat, and very high percentages of crude fiber. In fact, the oat hulls in themselves as a source of nutrients, are no better, and not as good as straw and stalks, the natural waste products of the farm. In this case, the object in making a feed is to utilize a waste of no considerable value in itself, while in the instances already noted, the object is to utilize residues of actual nutrients, and which are of considerable value. Because of the low feeding value of these by-products, because in themselves practically worthless from the nutritive standpoint, the method adopted has been to add a small quantity of other valuable feeds to these, and by attaching high-sounding names to the mixtures, and lower prices than are fixed for high-grade products, to encourage their wide use. There may be, and undoubtedly are, conditions where the use of these mixed products would be desirable, as, for example, where farmers do not have a considerable quantity of bulky material, and where the necessity is for bulk, as well as for actual nutrition. On most dairy farms, and also upon grain farms, there is usually an abundance of material of this sort, and for these farmers the purchase of oat feeds cannot be regarded as economical in any particular. In many cases, more or less of the concentrated feeds, as cottonseed meal, linseed meal, gluten meal, etc., have been added to the oat hulls, in order to increase the protein content, and consequent nutritive value, and that some returns may be obtained in their use.

These various feeds naturally fall into two general groups, one in which the protein is the chief constituent, and the other in which the carbohydrates are largely in excess, or into protein and carbohydrate feeds. In the case of the protein feeds, there is a wide range in the amount of this substance which may be obtained for a given sum from the different groups, making it a matter of the very greatest importance for the farmer to ascertain the character of the feed that he desires, and that he should carefully study the relation between the content of nutrients and the selling price.

The carbohydrate group includes many of the oat feeds, and feeds prepared from refuse waste products, and while there is not so great a variation in the content of carbohydrates or in the content of protein as in the other class, they as a rule supply the farmer with this substance, which he already has in excess, and their purchase cannot be regarded as economical.

Investigations as to the functions of the various groups of nutrients, protein, fat and carbohydrates, have clearly established certain general principles, among which is, that of all of the groups of substances protein is the most important, because it is the only one from which the protein substances of the body may be derived, and because it may also contribute to the building up of the body in fat. It must, therefore, exist in all rations, whether fed for maintenance only, or for increase of animal product, and the amount of protein in reference to other substances exerts an important influence upon the production of animal product, whether of meat, milk or fat. Investigations, however, have not yet clearly indicated the exact relation that protein must sustain to the other substances in the rations, though that it shall be in greater excess in those rations intended for the building up of animal product than for those for simple maintenance, has been clearly indicated.

Studies of the composition of the ordinary home-grown products, for example, the cereal grains, have also made clear the fact that they are as a rule deficient in protein. Hence, in the preparation of rations for dairy cows, for young stock, and for the making of beef or mutton, the purchase of feeds resolves itself into a purchase of protein, provided economy in the use of nutrients is desired. It must not be understood, however, that economy in the use of nutrients is identical with economy in feeding, as it may very frequently happen that economy in the use of nutrients may not be economical feeding; conditions may be such that the feeder can better afford to waste a portion of his carbohydrates, than to purchase protein foods that will enable an economical use of them. The conditions of the feed markets at the present time show, however, that the average cost per ton of the protein feeds, or those which exceed in content of protein, any of those likely to be produced upon the farm, is but little greater than the average cost per ton of the feeds of the carbohydrate group. That is, the average cost of 31 different protein feeds, ranging from 15 to 44.5 per cent. protein, according to the records obtained at our Station last year, was $24.28 per ton. The average cost of 18 carbohydrate feeds, ranging from 8 to 13.5 per cent. of protein, and including all of the oat feeds, was $23.62 per ton.

In view of these facts, it is not likely to be an economical practice to waste carbohydrates, as the excess of the expensive carbohydrates could be profitably exchanged for the protein that is likely to be needed. The situation in relation to the supply of protein, and the cost, makes it a very pertinent question as to whether the farmer may not avoid in a measure the pitfalls likely to be encountered in the purchase of concentrated feeds by a larger growth and use of those crops which contain this important element protein in larger amounts than is contained in the average products now grown. The one objection that is offered to this line of procedure, is that in the making of rations it is necessary, in order that the animals may be properly nourished, that there shall be associated with the ordinary roughage products, more or less of the concentrated forms of nutriment, and that it is not possible to completely and satisfactorily nourish an animal under present artificial conditions.

There may be, and doubtless is, a basis of truth in this view. Nevertheless, it does not follow that though a farmer shall increase his acreage of protein crops, that he shall not feed more or less of the concentrates, and it does follow, I think, from the data we have at hand, that by increasing his protein crops, he decreases the necessity for purchase in just that proportion.

Experiments recently carried out in this country, and to which I shall refer more in detail later, clearly show that a number of crops may be grown which may for all practical purposes be substituted for the concentrated feeds, at a very great saving in the cost of nutrients, and a consequent reduction in the cost of a pound of beef, mutton or milk.

### The Protein Crops.

The first question which naturally arises, is what kind of crops shall be grown, or what kind can be grown, that will enable the farmer to accomplish this most important result. Fortunately, recent studies have shown the adaptability to our conditions of a considerable number of crops and until recently, not largely grown, which may be used for this purpose. Crops, moreover, that are richer in the element protein, so important in any ration, and so necessary for the proper utilization of our other crops. These crops belong to the clover or legume family, and possess a further advantage, in that their growth and removal from the soil does not materially reduce the content of soil nitrogen, but rather adds to the crop-producing capacity of soil by improving physical character, and increasing their store of nitrogen.

Further, because of the number of plants belonging to this group, and because of their wide range of adaptation to the various conditions, it is possible to introduce one or more of them into the regular systems of farm practice, without interfering with useful and profitable rotations. Many of them, for example, the various clovers, red, crimson and alsike, are already grown extensively, and their value in the rotation well understood by practical men. There are many others, however, whose characteristics of growth and adaptability to the various conditions have not been carefully studied until recent years, and whose usefulness, therefore, is just beginning to be appreciated. Among these are the Canada field pea, the soy bean, the cow pea and the various varieties of vetch, all possessing that valuable power of appropriating for their use the free nitrogen of the air, and thus contributing directly to the potential fertility of the soil.

Another crop belonging to this class, which is yet in its experimental stage in the Eastern States, is even more valuable than any yet mentioned, namely, alfalfa. For feeding purposes there is no plant that is so promising, first, because of its high feeding value; second, because of its rapid growth, and consequent large annual yield; and third, because it is a perennial, and may be harvested from year to year without expense of reseeding or of cultivation. The experiments thus far conducted seem to point to the fact that this crop can be grown wherever good corn can be grown. That is, on soils naturally well drained and reasonably fertile.

The experiments conducted at the New Jersey Station, show that the average cost per ton of dry hay, for five years, even with heavy manuring, was but $5.26 per ton, and that the feed value of this hay compares favorably with the protein feeds, which at present prices cost $22 or more per ton. This crop, more than any other, fulfills that very important requirement, a cheap source of protein for balancing other home-grown products. Its growth cannot be too strongly recommended. An ideal situation would be where the farm is growing corn and alfalfa to supply the entire needs of the herd.

The introduction of nitrogen-gathering crops has, too, a greater significance for the man who manufactures any form of animal product than for the grain farmer, because the selling or market price of the grain or hay crop is not enhanced because of its containing a larger amount of nitrogen, while it does increase feeding value, as the nitrogen is the basis of the protein of his ration, the substance which is usually deficient when only the regular farm crops are used, and if without home supplies must be purchased.

Other protein crops, not now largely grown, and which possess these desirable characteristics, are crimson clover, cow peas, soy beans, winter and spring vetch, and field peas. Crimson clover is in the true sense a catch crop, and thus when it can be successfully grown is a positive addition to the regular crops of the farm in addition to its value as a source of protein. The hay is richer in protein than red and alsike clovers, is palatable, and will successfully substitute an equivalent quantity of protein in other hays of the same class. The chief disadvantage from the standpoint of the hay grower, is that it matures too early to permit of its full use as a hay crop. It certainly can be successfully grown when conditions are right in all of Eastern Pennsylvania, and its introduction will add not only to the home supplies of protein, but will assist in soil improvement.

The cow pea and soy bean are summer forage crops, and in addition to their soil improving characteristics, are excellent sources of protein, used either as green forage or hay. These plants may be successfully grown in many portions of this State and without interfering with regular rotations, as the crop may successfully follow a crop of oats and peas, cut for hay, and make a crop of hay in time to seed down with wheat or rye.

The Canada field pea and the spring vetch are preferably used with oats, and while the mixture is not as rich in protein as if seeded alone, or not as rich as the other crops mentioned, they are valuable additions to our list of forage crops.

Winter Vetch is also serviceable, more particularly as a green forage crop than as hay, and should be sown with winter wheat or rye.

The average content of protein in these various leguminous hay crops, is for:—

| | Per Cent. Protein. |
|---|---|
| Red clover | 15.3 |
| Alsike clover | 11.4 |
| White clover | 14.1 |
| Crimson clover | 15.5 |
| Alfalfa | [illegible] |
| Cow peas | 15.5 |
| Soy beans | 15.4 |
| Canada field peas | 13.7 |
| Vetch | 17.0 |

These averages compare very favorably with those shown by the bran and middlings from wheat, rye and buckwheat:—

| | Per Cent. Protein. |
|---|---|
| Wheat bran | 16.1 |
| Wheat middlings | 15.6 |
| Rye bran | 14.7 |
| Buckwheat bran | 12.4 |

Owing to the larger content of crude fiber in the protein forage crops than in these various concentrated feeds, showing the same content of protein, they are more bulky, and the rate of digestion of the various groups of nutrients is usually lower than in the feeds, thus making this basis of comparison hardly fair to the feeds, though the average digestibility of the two classes of foods is not widely different. The average co-efficients of digestibility are:—

| **For Wheat Bran:—** | Per Cent. |
|---|---|
| Dry matter | 61 |
| Protein | 79 |
| Crude fiber | 22 |
| Nitrogen-free extract | 68 |
| Ether extract | 68 |

| **For Alfalfa:—** | Per Cent. |
|---|---|
| Dry matter | 60 |
| Protein | 74 |
| Crude fiber | 43 |
| Nitrogen-free extract | 66 |
| Ether extract | 39 |

| **For Crimson Clover Hay:—** | Per Cent. |
|---|---|
| Dry matter | 62 |
| Protein | 69 |
| Crude fiber | 45 |
| Nitrogen-free extract | 62 |
| Ether extract | 44 |

| **For Cow Peas:—** | Per Cent. |
|---|---|
| Dry matter | 59 |
| Protein | 65 |
| Crude fiber | 43 |
| Nitrogen-free extract | 71 |
| Ether extract | 50 |

| **For Soy Beans:—** | Per Cent. |
|---|---|
| Dry matter | 62 |
| Protein | 71 |
| Crude fiber | 61 |
| Nitrogen-free extract | 69 |
| Ether extract | 29 |

It is evident from the data now available that protein forage crops are important sources of protein. The questions of practical interest to the feeder, therefore, are: First, can they be successfully grown? Second, is the yield of nutrients per acre large enough to make their growth desirable? Third, the economy of their use as substitutes for the concentrated feeds.

In reference to the first point, it may be said that of all the crops mentioned can be successessfully grown in all parts of New Jersey, and certainly in many sections of Pennsylvania, though inasmuch as a number of them are relatively new crops, some knowledge must be possessed concerning the proper time and method of seeding, and of handling the crop.

### Alfalfa A Success.

In the case of alfalfa, it has been pretty clearly proven, that the plant is hardy in all of the Middle States. It is, I think, a fact that there are more failures than successes. The failures are, however, due in many cases to improper methods of seeding, to lack of proper fertilization, preparation of soil, and to the absence of the specific alfalfa bacteria in the soil. In New Jersey, where success has been attained, the following points have been carefully observed:

First, a soil naturally well drained, with a subsoil not too compact; second, the land limed at the rate of 30 to 40 bushels per acre, and thoroughly mixed with the soil; third, an abundance of available mineral food, derived from acid phosphate, ground bone and muriate of potash; fourth, thorough preparation of the seed-bed, making it as fine as possible; fifth, an abundance of good seed, at least 30 pounds per acre, and should be seeded either early in spring, as soon as danger of frost is past, or early in August, and without cover crop; sixth, inoculation of the soil with portions of soil from old alfalfa patches, or with the pure cultures; seventh, spring seedings should have the weeds kept down by frequent cutting; eighth, the crop cut when blossoms begin to appear, and this without regard to the size of the crop; ninth, the curing of the hay carefully performed. Handle before too dry, and allow to cure in cocks.

It may be that a successful catch and subsequent profitable crops do not require attention to all of these points, though all have been observed in those entirely satisfactory.

Cow peas and soy beans should not be seeded until the latter part of May. A safe period to begin seeding, is the last week in May. The best soils are those of a sandy or porous nature, or those that may be described as open and friable. Land should be preferably limed (though it is not so essential as in the case of alfalfa), and well supplied with phosphoric acid and potash. Seed at the rate of 1½ bushels per acre, if broadcasted, and from three pecks to one bushel per acre, if put in in drills. The crop should be harvested when the pods are just beginning to form, and in curing should be handled in the same manner as described for alfalfa.

### Crimson Clover.

Crimson clover seeded in corn at the rate of 12 to 15 pounds of seed per acre, at the last cultivation, and lightly covered by a harrow or light cultivator. This crop grows ordinarily where corn grows well, and failures to withstand the winter are due more often to a lack of lime and other plant-food, and the specific bacteria in the soil, rather than to any lack of hardiness. When seeded primarily for a forage crop, or hay, the land should be well prepared, and about 15 pounds of seed broadcasted and lightly covered. The hay crop will be ready to harvest by the 20th of May. The combined crops of oats and peas, and oats and vetch, are readily grown wherever oats do well.

The New Jersey Station's experiments show a considerable variation in the yields of different years, due to seasonal and other conditions, though the average yield of alfalfa has been five tons; of cow peas, soy beans and crimson clover, about 1½ tons per acre each, though as high as an equivalent of four tons of crimson clover hay has been secured. The peas, beans and clovers have shown a wider variation in yield than in the case of the alfalfa, which is doubtless due to the fact that the yields of different years have been obtained from the same acre.

The average cost per acre is, for alfalfa, $26.30; for cow peas and soy beans, $10, and for crimson clover hay, $4.50, the latter when seeded in corn, as the main cost is the seed and harvesting; it would be greater when the land is specially prepared for the crop, though naturally the yield would also be greater, probably making the cost per unit of crop not widely different. The differences in the cost of cow peas are largely due to variations in the cost of seed, as the cost of preparation of land and fertilizer has been practically the same each year. Based upon average yields, therefore, the cost per ton of alfalfa hay is $5.26, the cost per ton of cow pea and soy bean hay, $6.66, and of crimson clover hay, $3 per ton. The average yield per acre of nutrients has been for:—

| | Protein. Lbs. | Fat. Lbs. | Fiber. Lbs. | Nitro'n-Fr. Ex. Lbs. |
|---|---|---|---|---|
| Alfalfa | 1,650 | 270 | 2,710 | 3,720 |
| Crimson clover | 1,465 | 57 | 894 | 1,070 |
| Cow peas | 465 | 66 | 660 | 1,200 |
| Soy beans | 462 | 156 | 669 | 1,158 |
| Or an average per acre of | 761 | 137 | 1,233 | 1.787 |

One ton of wheat bran contains:—

| Protein. Lbs. | Fat. Lbs. | Fiber. Lbs. | Nitro'n-Free Ex. Lbs. |
|---|---|---|---|
| 322 | 90 | 160 | 1,090 |

or, the average yield per acre of protein in these crops, is 2.36 times greater than in the wheat bran, the fat 1.52 times greater, and the nitrogen-free extract 1.64 times greater.

### The Money Saved.

On the basis of cost, very interesting relations are also shown. The average cost per acre of the total nutrients obtained in the protein crops was $12.62. The average cost of a ton of wheat bran at the present time will probably not vary widely from $22. Or, in other words, $1 invested in the group of the protein crops will secure:—

| | | |
|---|---|---|
| Protein | 60.3 | lbs |
| Fat | 10.8 | “ |
| Fiber | 97.7 | “ |
| Nitrogen-free extract | 141.6 | “ |

$1 invested in wheat bran will secure:—

| | | |
|---|---|---|
| Protein | 14.6 | lbs |
| Fat | 4.1 | “ |
| Fiber | 4.2 | “ |
| Nitrogen-free extract | 58.2 | “ |

Or, $1 invested in the protein crops will purchase over four times as much protein, twice as much fat and two and one-half times as much nitrogen-free extract as is obtained from wheat bran for the same money.

It will be seen, therefore, that the advantage from the standpoint of total nutrients is clearly with the protein crops, and more than sufficient to counterbalance the possible increase in digestibility of the wheat bran, and it is more than likely that the farmer distant from centers of population, may be able to reduce the cost of his nutrients in the protein crops, while on the other hand the cost of his wheat bran may be increased, because of the greater cost of carriage.

The final point to consider, therefore, is in how far these more bulky protein crops may be able to substitute such products as wheat bran, mainly to supply the needed protein. Experiments have been conducted at a number of experiment Stations to test this point, and the results have been as a whole very concordant, though I shall quote only those that have been conducted at our own Station, as they have a more direct bearing upon the particular point at issue.

In 1901, the first experiment was conducted in which four animals were fed 60 days, in two groups, in periods of 15 days each, with ration No. 1, made up of:—

| | | |
|---|---|---|
| Silage | 35 | lbs |
| Alfalfa hay | 11 | “ |
| Mixed hay | 6 | “ |
| Cottonseed meal | 2 | “ |

**No. 2, made up of:—**

| | | |
|---|---|---|
| Silage | 35 | lbs |
| Mixed hay | 6 | “ |
| Wheat bran | 4 | “ |
| Dried brewers' grains | 4 | “ |
| Cottonseed meal | 2 | “ |

The composition of the two rations was practically identical, so far as the protein was concerned, though the dry matter in the alfalfa ration exceeded that in the mixed grain ration. The main difference in the two rations was, therefore, the substitution of 11 pounds of alfalfa hay for eight pounds of an even mixture of wheat bran and dried brewers' grains.

Without going into details, which may be found in our bulletin No. 148, suffice it to say, that the mixed grain ration, which cost 15.38 cents, or 27.3 per cent. more than the alfalfa ration, produced but 4.5 per cent. more milk, and 6.7 per cent. more butter than were produced from the alfalfa ration. Thereby reducing the food cost of milk from 70.7 cents per hundred to 58 cents per hundred, and the cost of butter from 14.3 cents to 12 cents, illustrating very clearly that alfalfa may substitute a part of the protein feeds, not only, but in so doing reduce the cost of the product.

In 1902, further experiments were conducted and reported in bulletin No. 161, in which alfalfa, crimson clover hay and cow pea silage were substituted for the purchased feeds. In the alfalfa experiment, the home-grown ration was made up entirely of alfalfa hay and corn silage, namely, 13 and 30 pounds, respectively, and compared with a feed ration made up of:—

| | | |
|---|---|---|
| Silage | 30 | lbs |
| Mixed hay | 5 | “ |
| Wheat bran | 6 | “ |
| Dried brewers' grains | 5 | “ |

The alfalfa used in this experiment was richer in protein than that previously used, and this combination of hay and silage furnished practically the same amounts of protein as were contained in the feed ration. The feeding period was 32 days.

The result of this experiment, so far as yields were concerned, were practically identical with the one just reported, namely, that 4.15 per cent. more milk and 4.16 per cent. more butter were produced from the feed ration than from the alfalfa ration, though the cost of the alfalfa ration was but 13.6 cents, and of the feed ration 21.3 cents, or 56 per cent. greater, making the feed cost of 100 pounds of milk, with the food ration 83.9 cents, and with the alfalfa ration 55.9 cents, and the cost of butter 16.7 cents with the feed ration, and 11.1 cents with the alfalfa ration. Or, in other words, the use of the purchased feed ration caused an increase of over 50 per cent. in the cost of both milk and butter.

Crimson clover hay was also used in another experiment the same year, to substitute the feeds in the ration already referred to. This ration consisted of 16.4 pounds of crimson clover hay and and 30 pounds of corn silage.

The results of this experiment, showed that the feed ration produced 18 per cent. more milk and butter than were produced by the crimson clover hay ration, though valuing the crimson clover hay at the market price, namely, $12 per ton, there was a very considerable saving in the cost of the milk and butter produced, namely, for milk, from 89.5 cents per hundred, for the feed ration, to 71.2 cents per hundred for the crimson clover hay ration, and for butter from 18.19 cents per pound to 14.46 cents per pound.

If the cost of the crimson clover hay ration had been calculated from the actual cost of the hay, rather than at the selling price, the cost of the home-grown ration would have been reduced by 6.56 cents, or to 78 cents per day, making the feed cost of 100 pounds of milk 38.7 cents, instead of 71.2 cents, or making the cost of the product from the feed ration more than double the cost of the home-grown ration.

### Value of Cow Pea Hay.

Another experiment conducted the same winter, in which cow pea silage and crimson clover hay, were substituted for the feeds, and corn and cob meal, another home-grown product, used to supply the carbohydrates furnished by the silage, was carried out, and with quite as satisfactory results. In fact, more satisfactory from the standpoint of yield from the home-grown product, as the yield from this ration was slightly larger than that from the feed ration. While the cost was also reduced, though this was necessarily estimated, as it was impossible to determine the exact losses that occurred in the making of the cow pea silage, and known to be considerable. Nevertheless, the point that these products can be substituted for the concentrated protein feeds on the market was clearly demonstrated.

In 1904, an experiment was conducted in which cow pea hay was substituted for the concentrated feeds in a ration for dairy cows, the rations used being from home-grown products: 17 pounds of cow pea hay and 36 pounds of corn silage. The feed ration made up of:—

| | | |
|---|---|---|
| Corn silage | 36 | lbs |
| Cut corn stalks | 5 | “ |
| Wheat bran | 4 | “ |
| Dried brewers' grains | 3 | “ |
| Cottonseed meal | 2 | “ |

In these rations, as in the other cases, the aim was to supply practically the same amount of total nutrients, though the home-grown ration continued a larger amount of dry matter than the feed ration. This experiment continued through a period of 36 days, and the results were as follows:—

| | Cost. | Yield of: | | Cost to produce: 100 lbs. | 1 lb. |
|---|---|---|---|---|---|
| | | Milk. | But. | Milk. | But. |
| | Cts. | Lbs. | Lbs. | Cts. | Cts. |
| Cow Pea Hay Ration | 9.42 | 1,421.1 | 64.05 | 39.80 | 8.82 |
| Feed Ration | 15.52 | 1,539.0 | 73.84 | 60.51 | 12.60 |

As in the other cases, the total yield of milk was greater from the feed ration than from the home-grown ration, though the cost of the feed ration was much greater, making the cost per hundred of milk and per pound of butter over 50 per cent. greater than for the home-grown ration.

These experiments, while they show that pound for pound the nutrients combined in the home-grown products are less digestible than those obtained in purchased feeds, the lower rate of digestibility is not sufficient in any case to make the cost of product greater, but was in every case sufficiently high to reduce the cost of the animal products obtained from 50 to over 100 per cent.

One point that has not yet been clearly settled in reference to the matter, is whether the continued feeding of so large a proportion of roughage as must be used, in order to supply the nutrients in sufficient amounts and in good proportions, would have any unfavorable effect upon the health and vigor of the animal. So far as the experiments were concerned, there was no apparently unfavorable influence, and experiments are now in progress to study this point more fully.

Unfortunately, too, we have no data in the Eastern States in reference to the substitution of these products for concentrated feeds, in the making of beef or mutton, or in the raising of young stock, though abundant proof from many Western States, where alfalfa is a leading crop, of the advantages in the making of beef and mutton, and I have no doubt that the principles which have proven true in the feeding of dairy cows would be applicable in the feeding of beef.

The points of practical importance that have been established, are that the growing of these crops is entirely practicable, that they may be produced at a cost much lower than now has to be paid for the same class of nutrients in concentrated feeds, and that their substitution for those feeds in rations will result in a reduction in the cost per unit of product. It only remains for the farmers, who have not practiced this method, to learn all they can concerning the crops suitable for the work, and to experiment themselves under their own conditions.

## DISCUSSION.

**A Member:** The majority of farmers practice practically the four years of rotation—followed by oats, oats followed by wheat and corn wheat followed by grass. Now, would it be practical for the farmer to raise Canada peas and oats instead of an oats crop, and follow the Canada peas and oats with cow peas without disturbing the cereal crop or straw crop, which should be either wheat or rye? Would the cow pea crop make it too late and should that cow pea crop be made into hay or profitable silage? If it could should it be mixed with corn or would it pay a man to put it in the silo or harvest with the cow pea crop, taking into consideration the fact that the season might be late and might make it very difficult to cure the hay?

Prof. Voorhees: Our results show that the cost of nutrients in the oat and pea hay is much less than if the oats were ripened and the peas and oats were threshed and ground. That is, we get as large an amount of digestible nutrients at a lower cost by making it into hay. We have also shown that if it is made into hay it can be harvested the latter part of June with us—anyway by the first of July with you. Then by seeding immediately and without plowing the ground—stir up the surface and sow cow peas and then if your season is good, and the period from July 1st on is, of course, the warmest period of the year, they will mature sufficiently to make hay the first week in September. That is the practice we have been using for a short time.

Then follow with your rye. By this method you have gained one crop, and ordinarily that crop will give you at least a ton and a half of cow pea hay, which is worth about as much practically as a ton of wheat bran. You have the hay, but you have a better source of protein from your oats and peas. You have improved the land for the rye or wheat that follows.

Experiments have been conducted in several of the southern states and abroad as to whether it is better to remove the cow peas or plow them under for the seeding of wheat or rye as compared with manuring, and they have found that it is much better to remove the crop. The following crop is better than if it had not been removed, and quite as good as if the crop had been manured or fertilized in the ordinary way. I think that is a very desirable modification of the old practice of four years' rotation, because it brings in one protein crop, brings in another nitrogen gathering crop which has the value of increasing the store of home-grown protein as well as conserving the fertility elements in adding to the nitrogen substance in the soil. I think it is a very desirable thing. Where you raise your oats and thrash them you don't get any more but increase your labor. You will get more good out of it if you make it into hay.

One point I ought to call your attention to: That is, the difficulty that sometimes we have in making the cow pea hay, soy bean hay, or alfalfa hay, because it is a leguminous crop and very watery. It has to be handled carefully because in the handling when it is drying the best portions are lost. It has to be handled when it is not too dry so as to prevent loss of that sort. And sometimes when you harvest your cow pea hay in September the weather is not very good, then it is a question whether you should put it in the silo or make hay of it. If the weather is too bad put it in the silo, though it does not make the best kind of silage, for when it is digestible and palatable it has a peculiar odor. But it seems to me whether it should be put into the silo or made into hay depends upon the time you want to harvest it. There is another advantage in having the hay—you can adjust the proportions in your ration much better than you can in the silage form.

A Member: It is a serious question with us. We have no oats for our horses unless we go outside and buy them, which the farmer objects to. It is a considerable expense. can we take that crop of pea and oat hay and make it answer for the feed of the horse?

Prof. Voorhees: For ordinary farm work it is quite as good.

A Member: What would you say of thrashing your oats and pea hay and grinding it?

Prof. Voorhees: That is all right but it costs you more and you lose your time, and time is an important factor then, for if you get into the middle of July which you will have to do, you lose time, and you do not get any more nutriment and it costs you more money. That is our experience. I think it is the experience of others. It is very nice to have oats and peas ground and it is a very good thing.

A Member: Do you think if you take off the cow peas and stir up the ground it would be sufficient instead of turning it?

Prof. Voorhees: Yes.

A Member: Would it be better to stir it?

Prof. Voorhees: Yes. We plow only once a year.

A Member: In the spring would be the only plowing you do?

Prof. Voorhees: Yes.

A Member: How much oats and cow peas do you raise to the acre?

Prof. Voorhees: Oats and Canada peas mixed together? That depends upon your land. Over here in Pennsylvania you should raise two tons, with us a ton and a half of hay.

Mr. Lantz: I belong to that class of practical farmers who must make their bread and butter out of their farm. I have been quite a student of the relative value of the food ration for sometime, and a few weeks ago I had a fresh Jersey cow three years old which I had been feeding with five quarts of equal parts ground corn, oats and bran, and the roughage was of corn stover. I was getting from 38 to 41 pounds of milk per day. I wanted to get as near 50 pounds of milk per day as possible, and I omitted the corn stover and gave her all clover hay, nice well cured, and alsike for roughage, and to my surprise the flow decreased about four pounds per day. I put her back to the corn stover and she went back to the flow of 38 to 41 pounds. Now, what I want to know is, where did I make my mistake in the changing of this ration, substituting the protein or clover hay for corn stover, and what should I have done or could I have done to have increased the flow? These are practical things that come up. I thought I was going to increase the flow by feeding the clover hay in place of the corn stover, but to my surprise the flow decreased. When I put her back to the old ration she was all right.

Prof Voorhees: How many days did you keep her on the clover hay?

Mr. Lantz: About five days; kept going down all the time.

Mr. Dietrich: The shock to the animal system in making a change from one food to another. Five days will just do such a thing as that. If you had tried it for five weeks you would have found a different state of things.

Mr. Lantz: I did not ask the question to puzzle anyone. I asked for information. I am a student and wanted to learn.

Prof. Voorhees: We have found that to be true in all of our experimental work. We have what we call the transitional period of ten days, so that the shock may be overcome in changing from one ration to another. And we always find that at least if we make a change of rations that is radical, there is very often a decrease in the flow of the milk; it may be the other way, but if you continue that feed for a week or ten days you will find things get all right.

A Member: Have you had success in growing alfalfa? It is a wonderful crop if we can only raise it. This last summer my attention was called to a growing field of alfalfa quite successfully, and the owner was feeding shoats. I think it was in June, and they were in poor condition at the time. He put them in his barn and fed them on nothing but alfalfa hay and water and those shoats, according to his description, grew

in weight on nothing but alfalfa. We can't grow it on account of being choked out by the natural grasses and weeds. I want to know if you have any experience in this line, whether that would the grown successfully.

Prof. Voorhees: That is one great difficulty we have in spring seeding the summer grasses, those summer weeds, so that I am rather inclined to believe that the best time to seed is in the latter part of July or the first of August. If you get your ground well covered you don't have the summer weeds to interfere with you, and while the first crop next year will not be so good as if seeded the year before, nevertheless you don't lose the use of your land for a year. So that I am rather inclined to recommend that the seeding be made about the first week in August. Last year we seeded several areas, beginning with June; I seeded an area every month beginning with June,—June, July, August and September; and the July and August seedings were exceedingly favorable; the June seeding was a failure and the late September seeding was also a failure. I expected it would be. But I am very strongly in favor of the attempt of the farmer to grow alfalfa. I believe it is going to be one of the elements of salvation to our eastern dairymen.

Now, this question of whether you can grow or cannot grow depends largely upon the man. There is no patent upon it. When we started to grow it we didn't inoculate the soil; we didn't know very much about it.

A Member: Down in New Jersey they call Prof. Voorhees the Alfalfa and Omega of agriculture.

A Member: There is a farmer in our section who has mixed alfalfa seed with his other grass seeds every year for the purpose of trying to inoculate the soil in that way. Would you recommend that?

Prof. Voorhees: Well, there is a farmer in our town who has been very successful just in that way, and I regard that as rather a nice way to begin. He is a farmer who has grown alfalfa for several years and gets an excellent crop. I don't think he had quite as large a yield, but he has simply seeded his wheat with that alfalfa instead of clover seed. When he seeded his wheat he sowed alfalfa and timothy.

A Member: Sowed them together?

Prof. Voorhees: Yes, in the fall. Did it along in the latter part of August. I know the history of that case. I know exactly what he has got. That man got about two and a half times what he could have gotten from his ordinary grasses. He was successful in getting it through the winter. Now, he cuts alfalfa, timothy and clover about the 20th of June. Then he gets the next crop about the first of August, somewhere along there, and then pastures from that on until winter, and last year he got four tons and a half of splendid hay. I know it because I bought it from that farmer. He was foolish to sell it, sold to me for $14 a ton. It is excellent. It is a good way to start, as it is not expensive. A great many people might start and prepare thin land and quite a great expense for fertilization and lime and all that sort of thing and fail, and that might discourage them forever.

A Member: Has he followed that long enough to prove to his satisfaction his crop is improved by the inoculation that my friend speaks of?

Prof. Voorhees: No, I think not that. He has grown alfalfa on his farm and perhaps the soil is inoculated. I am not a disbeliever in this inoculation. I believe we are going to be misled in this matter of inoculation by some of the statements made. Farmers get a notion it is a question of inoculation and not a question of good preparation of the soil. Now then the successful inoculation is likely to follow in that soil which has been well prepared, so that you don't want to let up a minute on the preparation of the soil, the inoculation, the fertilizers and things of that sort.

A Member: I am glad to endorse Prof. Voorhees on that subject. I think he is perfectly right in saying there is a good deal in the man. I was as much of a believer in alfalfa as anyone. I tried to grow it for several years and failed it entirely, and after reading up carefully I tried it again. I tried it last year and as before stated here, made a perfect seed bed, cultivated thoroughly and I sowed it just at the time Prof. Voorhees recommends, about the second week in August. I have got just as good a stand of alfalfa as any one would want to see. I sowed about 28 or 30 pounds to the acre. I drilled pretty heavy and I put it in with the corn drill so that it would be evenly distributed and is is entirely satisfactory. I believe all farmers here in eastern Pennsylvania can grow alfalfa if they want to. It depends entirely upon this preparation of your soil.

A Member: Wouldn't the manure furnish the necessary bacteria to inoculate the soil?

Prof. Voorhees: Not always, no. It will make a better soil for the development of bacteria.

A Member: Would you drill the cow peas in sow broadcast?

Prof. Voorhees: I think possibly drilling would be better, you get a larger yield. We do both.

# PROFITABLE TYPES OF LIGHT HORSES

By Dr. George M. Rommel, Bureau of Animal Industry, U. S. Department of Agriculture.

## AFTERNOON SESSION.

President Norton called the convention to order at 1.30 P. M.

President Norton: The first thing on the program this afternoon is an address, entitled

### "Profitable Types of Light Horses."

Mr. President and Members of the Pennsylvania Live Stock Breeders' Association:, In discussing profitable types of light horses, I want to speak on those types or classes of horses that are profitable from the standpoint of the man that takes them to the market and sells them. By a profitable light horse we understand then a horse that will pay the breeder for producing him when he takes him down to the place where the horses buyers congregate and pay good money for good animals.

There are three general classes of light horses on most markets: The roadster class, the carriage class and the saddle class. They are known under different names. The roadsters are known as drivers, gentlemen's drivers, light drivers or roadsters as the case may be. Carriage horses are known under such names as carriage horses, carriage teams, coach horses, coachers and actors, etc. Under the class of carriage horses there are two general sub-classes: Cobs and Harness ponies—neither one of them very numerous in any of our markets, but both profitable classes. Under saddlers, there are a number of sub-classes, but those classes are of importance principally as matters of general information than as actual sub-divisions of the market. Before going into the characteristics of these different classes, I want to speak briefly on the characteristics that are common to all classes of light horses which, speaking broadly, may be applied to all classes of horses, regardless of whether they are light or heavy, by means of which you can build up in the mind's eye the perfect horse. The variations from this make the characteristics of the different classes.

Perhaps the first and most important essential in a market horse is soundness. It is absolutely useless to expect to sell a horse that is unsound for a good price on any critical market. Unsoundnesses that are most common are those of the limbs and the respiratory organs. A marketable horse should not have a splint so high up on the leg that it interferes with the articulation of the knee joint. A splint may be small and low down and not seriously affect the selling price of the animal. Understand, however, that where you have to consider the highest type of equine beauty you want to avoid blemishes just as much as possible. A splint at best is a blemish, and naturally will result in a discrimination being made against a horse possessing one when he is sold. With light horses everything that is an offense to the eye must be avoided. The more beautiful a horse is, other things considered, the higher he is going to sell. There must be no ringbone, no side-bone, or other unsoundness of the feet, and in the hind legs no curb; no spavin, no thoroughpin or bog spavin; of course, he must not be a roarer or wind-broken. Now, most of these things are unsoundnesses that can be readily detected by any one who is at all competent in judging horses.

### Conformation.

The next point is conformation. The conformation of the profitable horse is one that must be learned with a great deal of study. The head should be well shaped, neat, clear cut and straight, with breadth between the eyes, a large, open nostril, fine cut muzzle, and clean, firm lips, a full, bright eye, a neat, well set ear of medium size, a clean cut, open jaw, with a wide angle between the jaws, that is, the jaws should set out rather than in, the jaws should not extend so far back that when a curb bit is put on the horse the jaw itself will press against the wind-pipe and interfere with his breathing. We must have a clean cut throttle, a neck of good length, clean cut and well muscled, a clean cut wind-pipe, high withers, and a sloping shoulder without any tendency to meatiness. The arm should be thrown well back, the forearm long, well muscled, and flat; knees good-sized, cannon clean cut and strong, with tendon well defined; straight fetlocks, sloping pasterns, feet of fair size, with dense horn, with high and wide heels. Now, that short back is a something that will fool a beginner in a good many instances, because if the horse has a straight shoulder his back is going to look longer. The back must be short, strong and straight, with the ribs deep and well rounded, the chest deep and the loins broad and strong. In the hind quarters there must be good breadth of croup, which should be straight rather than strong. the quarters should be well rounded, smooth, well muscled, and muscular, the thighs long, with open angles, the lower thighs should be long and well muscled. The hock—the most important joint in the body—should be wide, deep and clean cut in front; at the back the hock should come up to a rather fine edge. The cannon should be clean cut, cordy, the tendons standing out distinctly, and the bone should be clean. The fetlocks should be wide and deep, pasterns sloping—not so much slope is necessary in the hind pasterns as in the front ones. To ascertain the straightness of the legs stand immediately in front of the animal and drop an imaginary plumb line from the point of the shoulder; it should divide the leg from the knee down. At the side aline from the center of the arm should fall on the center of the foot. A line dropped from behind the point of the buttock should bisect leg from this point down; from the side this line should touch the back and coincide with the cannon throughout its length.

The point of quality is extremely important and hard to describe because it is a very intangible thing. The horse should have a clean cut appearance throughout; there should be a cleanness of bone, no meatiness below the knee and hock or around the shoulder. The head should be clean cut, and he should have a general well-bred appearance. His skin should be moderately fine and the hair soft.

### Action and Style.

The point of action is the next in importance. Action is extremely important in light horses. It should be straight and true. At the trot it should be what is known as the straight line trot, no wabbling from one side to the other, or swinging the feet. The action from behind should be straight, the feet picked up smartly, hocks well flexed, and the feet of both fore and hind legs at each step placed immediately in front of the former position.

Style is of the highest importance, and this is generally indicated by the way in which he carries his head, the general appearances of smartness, of good disposition, and nerve.

Then we have the point of manners. No horse is going to sell well in any of these classes that is not well mannered, or shows that he has had no education. I do not mean by that that he should lack spirit because he must have spirit, but he should have been taught how to behave himself in the case of emergency. This is especially true in the cases of horses that are sold for city use. A great many horses are very sharply discriminated against on this point.

The last point is that of condition. You know, of course, that if you send a steer to market that is not fat you are not going to get as much for him as you would if he was fat. To a certain extent the same thing is true of horses. It is not so true of light horses as much as with drafters, but a horse out of condition will not sell within twenty-five per cent of what he might sell for if he was in good condition. He should not be over-fed or over-fat, but he should have meat enough to cover his bones and make him look well fed and smooth.

Taking up the classes in greater detail let us begin with the roadster. The roadster class in size should be up to about sixteen hands, althought a great many very good roadsters or drivers are sold that are much lower than that, down as low as fifteen hands. The sixteen-hand horse, other things considered and being equal, generally will sell better than the small horse. A sixteen-hand roadster should not weight over 1,150 pounds. Roadsters have an angular and rangy appearance. The speed of the roadster should be about ten to fourteen miles an hour, but the more you can get the better, because speed adds materially to the value of a horse provided he has good conformation and true action. Condition is not as essential in the roadster class as it is in some other types—the carriage class is more important as far as condition is concerned of any of these light classes. There is not a great deal required in the way of showy action in this class. The horse must have a straight line trot, a frictionless trot. That is, he must move smoothly. There must not be any shakiness in his gait. The joints must work smoothly. You know what is said of the late Belle Hamlin. She seemed to fly like a bird when she moved, and some authorities regarded her action as one of the greatest models of the smooth, frictionless trot. Then the roadster must have the ability to extend himself, that is, the gait or stride must be long and not short or choppy or cut up. In the pacer, of course the action is different, but the same principle of straightness and lack of friction applies.

The walk is a point that breeders of horses have a tendency to neglect. You cannot trot a horse all the time if you are going to use your animal on the road. Therefore, you want one that has a rapid walk, and that can carry you along at a good pace when you do not feel like urging him into the trot. The walk should be regular and balanced, the steps taken in regular order, and it should be rapid and quick with a good long stride.

A member: Have you seen many horses that could walk well when short rigged.

Prof. Rommell: I am not speaking of the speed trotter now. I am speaking now of the horse that is useful from the market standpoint.

### The Carriage Horse.

The model carriage horse should be up to 16 hands and should weigh about 1,200 pounds. He should be more compact in conformation than the roadster, more muscular, rounder in body and smoother. Here is where condition comes in. Condition is thus highly important in this case. There should be ability to pull a considerable load, and for this reason we look to the muscular feature. The muscularity of the hind quarters is especially important; a sloping rump, low seated tail, and cat ham are very objectionable in a carriage horse. Other defects that must be guarded against are big heads, thick, short necks commonly known as bull necks, and meaty withers and shoulders. A great deal of speed is not required in this class of horses; from eight to ten miles an hour is plenty of speed. However, if your carriage horse has the conformation that is required for the class, and has considerable speed in addition he will sell just that much better.

Subclasses of this class are the cob and the harness ponies. A cob is nothing but a fifteen-one hands carriage horse, weighing from 950 to 1.050 pounds, and suitable for rather light vehicles such as ladies' carriages. Harness ponies are horses from fourteen-two or fourteen-three hands and under, with all the characteristics of the carriage horse. These little fellows frequently sell for as much as the large horses.

### Saddle Horses.

Saddle horses are primarily weight carriers. They are not intended to pull a load, and for that reason the conformation is quite different from that of the other type. The points of most importance are sloping shoulders, light, clean cut withers, short back, and muscular hind quarters. In addition to this there must be plenty of bone. It is not necessary that the saddle horse is as high as one of the other classes. A sixteen-hand horse is not necessarily a saddle horse. Very few men want to ride a horse that is that tall—it looks further to fall off, if one must get off in a hurry. Further, if the horse stands fifteen-two hands, he must have depth of body rather than length of leg. The bone of the leg should be abundant and strong, of good quality and dense. Broad loins are also of great importance here. The walk trot and canter saddle horse is the three-gaited horse that is generally known as the park saddler on the market. These horses are produced very largely in this country by taking good gaited saddle horses and neglecting to educating them in the rack or single foot. Many of the best horses that we have for this purpose are produced in that way. The gaited saddle horse is the five gaited horse, having the gaits required by the American Saddle Horse Breeders' Association. I might mention briefly the characteristics of hunters and polo ponies. Hunter horses as you know are those used by gentlemen of wealth and leisure hunting across country after hounds. For this purpose it is necessary to have a horse with considerable fore hand, that is depth of chest and depth of body, with very well muscled hind quarters. Hunters are generally divided into three classes, heavy weight, middle weight and light weight. A heavy weight hunter stands fifteen-two to sixteen hands and weighs at least twelve hundred pounds. Of course, for a very heavy man a heavier horse than that would be necessary, but this kind of a horse can easily carry a man weighing about one hundred and ninety pounds. The middle weight should stand from fifteen-one to say fifteen-two and weigh from eleven hundred to eleven hundred and fifty pounds. The light weight hunter weighs about one hundred and fifty pounds less. Let us consider briefly some points regarding the relative economy of production of these different classes. In 1904 the average prices on the Chicago market for the different classes of light horses were as follows: Carriage teams, $475.00 per pair; drivers, $150.00 per head; saddle horses, $160.00 per head. The price per head for carriage horses would thus be $237.50 each, so you see that it is considerably more valuable than either of the other classes. In the five years from 1899 to 1904 inclusive, carriage horses have increased in value much more rapidly than either of the classes. The increase in value per head has been $32.50 as against an increase of $10.00 per head in the other two classes.

## The Government Stud.

In this connection it may be of interest to the audience to refer briefly to some of the plans that are on foot for the production of a breed of carriage horses in this country from American material on an American foundation. The Department of Agriculture has recently inaugurated some experiments along this line in co-operation with the Colorado Experiment Station at Fort Collins. We have purchased a few horses and the plan of the experiment is to develop a breed of horses to satisfy the demand for carriage horses in this country. I have called your attention to the fact that the increase in value per head in five years has been three times as fast in the case of carriage horses—more than three times as fast—than that of roadsters or saddle horses. It has also been greater than the increase in value per head of draft horses, in spite of the improvement in business conditions, the increase in value per head for draft horses on the Chicago market in five years being $22.00. Now that increase has been due to the fact that the country does not have a supply of carriage horses to meet the demands made on the market. The supply has been largely obtained in past years by sending over the country looking for horses that will fill this class, and the horses that they have generally obtained have been those that are to a certain extent standard bred, that is they are by standard sires, (in many cases they are standard on both sides). These horses have been sent to the market and docked (if they were stallions they were usually castrated), and turned into heavy harness horses. So far as we have been able to find out. There has been no systematic attempt to formulate a breed by means of this material, and the market has been drawing this class of horse constantly from the breeding field with the result that as time progresses, the opportunity for demonstrating the value of the native blood and developing a breed of American carriage horse is constantly slipping from us and the country is presented with a situation somewhat analagous to that when the Connestoga draft horse and the old Morgan type began to decline.

The Department's work in this respect has a wider consequence, perhaps, than the interests of the horse breeder alone. If a breed of horses can be developed to fill this demand, it means that breeds of other classes of stock can likewise be developed. One of the most hopeful indications of the possibilities of the country in this respect is the success of the American farmer in developing breeds of hogs that are suitable to his own conditions You heard Mr. Lovejoy tell this morning how his herd was champion over all others at the Columbian Exposition.. We have produced our own breeds of hogs in this country on the foundation of the British breeders and by means of our own material, and these breeds of hogs are racially distinct. Furthermore, the breeders of beef cattle, in one instance certainly, perhaps in two, have reached a standard of excellence that is far ahead of anything done abroad and breeders of dairy cattle have in some instances surpassed the best that has been produced in other countries. Furthermore, we have in this country in the American trotter, the fastest and gamest breed of light harness horses in the world. The farmer can profitably produce light horses if he will breed for the very highest type. There are most difficult classes to breed for, for the reason that there is so much more to be considered. You must consider the appearance of the horse, his style, his action and suitability for the purpose for which he is bred. In addition you have to consider that point of soundness. There must be no "practical" soundness or anything of the kind. The light horse must be sound or he goes into the cheap classes.

If some of the gentlemen present have questions, you may bring out points that I have neglected in the presentation of this subject. At any rate, I thank you for your kind attention.

## Cavalry and Artillery Horses.

A member: Tell us something about the cavalry type.

Prof. Rommel: I would not like to address an audience of farmers on the cavalry type of horses for this reason: The War Department will not pay profitable prices for the

horses that they want for use in the army. It does not pay the farmer to breed for this type. The cavalry horses in the country are obtained in two ways: The first by purchases on the large markets such as Chicago, Kansas City, St. Louis and Omaha. Those horses are bought up over the country; they are practically misfits which could not be sold to advantage in a profitable market class. They are not showy enough, not handsome enough to make good carriage horses or good saddle horses, or they are too light. A second source of supply is the western range country where horses are produced in large numbers at minimum cost. Many of our army horses are bought there. The range breeder is the only one who can profitably breed for the cavalry or artillery. They are paying a better price now for cavalry and artillery horses than they have been in the past.

A member: What do they pay?

Prof. Rommel: Last summer as high as $225 was paid for artillery horses. That is a good price for them. Artillery horses usually have some draft blood in them. They can be produced by breeding small draft stallions on the ordinary run of farm mares. If one gets $225 for that kind of horse, it is one of the best. The War Department does not want draft characteristics in the cavalry horse. If the horse has good qualities of conformation, size, soundness and action, and is a handsome animal, the farmer will get much more for him from the regular market than from the army. Don't misunderstand, if he fills the bill called for by the army regulation a horse of the highest conformation will sell for two or three times as much as a saddle horse or carriage horse which he would as an army horse.

A member: Doctor, do you think it is safe to breed from a horse of a nervous temperament?

Prof. Rommell: It depends upon what you mean by nervous temperament.

A member: Do you think it could be overcome?

Prof. Rommell: It depends upon circumstances. Some horses seem to be of very nervous temperament when they are not so as a matter of fact. I don't think that the question can be accurately answered. The personal equation is just as important in the case of the driver as in that of the horse. Some persons can easily handle nervous horses, whereas others can do nothing with them. You may have noticed instances where a man would go driving and his horse would be almost pulling his arms out in a few minutes, but that man's wife may drive the same horse and have no pulling at all. Most of the horses that are shown in the horse shows have very nervous temperaments, and they must be handled only by persons who are familiar with them.

By Mr. Bayard: How should a saddle horse carry his head?

Prof. Rommell: Personally I prefer the peacock variety. We have had a judge at Madison Square Garden for several seasons who goes in for the Thoroughbred type. I think the average American prefers the peacock variety. The horse should carry his head and tail up, without any artificial stimulus. The manner in which he carries his head is very important. The neck should set out well from the shoulder. The neck is more or less straight in the Thoroughbred type.

A member: What would you do with a bucking horse?

Prof. Rommell: Kill him.

At this point in the proceedings the reports of committees were taken up.

The report of the committee appointed to audit the books reported as follows:

"We have audited the accounts of the treasurer, and find there was $29.95 remaining in the treasury."

It was moved and seconded that the report be adopted.

Carried unanimously.

It was moved that the president appoint a committee of five to confer with other organizations and protest against the repeal of the Grout bill. Motion seconded and carried unanimously.

Officers were elected as below:

President, W. C. Norton, Aldenville; first vice-president, Dr. Leonard Pearson, Philadelphia; second vice-president, M. P. Shoemaker, Greensburg; secretary, E. S. Bayard, Pittsburg; treasurer, J. F. Lantz, Glenmoore.

Executive Committee: W. G. Powell, Shadeland; M. N. Clark, Claridge; D. Norman App, Selinsgrove; William Berry, Washington; Geo. C. Watson, State College; James Blair, Hartstown.

Legislative Committee: Dr. Thomas Turnbull, Allegheny; H. W. Comfort, Fallingston; R. L. Munce, Canonsburg; J. H. Reichert, Scranton; S E. Nivin, Landenburg; Henry Palmer, Avondale.

Committee on Transportation: T. E. Orr, Beaver; Dr. J. Cheston Morris, Philadlephia; W. F. Shrum, Adamsburg; Jos. T. Fleming, Belleville; J. Grier Dain, Malvern.

Committee on Fairs: W. C. Black, Mercer; Jas. Blair, Hartstown; J. L. Henderson, Washington; J. D. Detrich, Flourtown; L. D. May, Granville Center; W. E. Perham, Niagara.

It was moved and seconded that the executive committee be authorized to act upon the next meeting place and time.

Carried.

It was moved and seconded that the association, through Mr. Bayard, tender the stenographer who has helped Mr. Bayard so in his work, a ten dollar gold piece as a recognition of her services which were given gratuitiously.

Moved and seconded. Carried unanimously.

Adjourned.

# THE DRAFT HORSE

By Thomas F. Hunt, Professor of Agronomy,
Cornell University.

Mr. President, and members of the Pennsylvania Live Stock Breeders' Association:

As secretary of the New York State Breeders' Association I bring to the Pennsylvania State Live Stock Breeders' Association the greeting of the New York Association. I may also say to you that New York State has a State Fair, and it does not have to tell any lies about it either. And not only do they have a state fair, but they have appointed a committee, of which Mr. Duncan is Chairman, the gentleman who spoke last evening, whose object it will be to hold in connection with this State Fair a winter meeting, such a meeting as you are now holding a winter fair, fat stock show. We invite, you, our neighboring state, to attend our state fair and see that we haven't told any lies about it. We expect to hold it in next December in connection with our winter meeting, and with our fat stock show.

I have been asked by your secretary, who is a good judge of poor material, to present a paper upon the draft horse, before this Pennsylvania State Stock Breeders' Association. It reminds me of the man who was asked to write a paper upon the subject of the Snakes in Ireland. You know what he wrote: "There are no snakes in Ireland." I am not familiar with the conditions in Pennsylvania. but in your neighboring state on the north where I have given the situation some attention, the breeders of draft horses are not unlike the snakes in Ireland.

Indeed, concerning not only draft horses, but horses in general, the North Atlantic States are consumers rather than producers of horses. The North Atlantic States contain more than one-fourth the population of the United States and produces one-seventeenth of the horses required to maintain the supply of horses needed; Pennsylvania contains one-thirteenth of the population and raises one-fiftieth of the horses of the United States.

This chart shows graphically the number of colts produced for each 100 horses kept in the United States and the different division thereof, as indicated according to census of 1900, by taking the number of yearling colts as a basis for such calculation.

It will be noted that in the United States for each 100 horses there are raised annually eight colts. This is the number required to maintain the supply wants of the country plus the exports. The total number of fresh horses required annually is therefore about a million and a half. The North Atlantic States produce but 3.5 colts for each 100 horses; Pennsylvania 5.1; South Atlantic States, 5.6; North Central States, 8.6; South Central, 7.5; the Western States, 12.9 colts. The Western States include those States west of Denver. It is here that the breeding of horses is most active in proportion to horses kept.

In the United States there is one colt raised annually for about every four farms; in the North Atlantic States one colt for every eight farms; in Pennsylvania one colt for every six farms; in Iowa one colt for every two farms.

It is probable that the North Atlantic States consume annually 150,000 horses worth over $15,000,000 more than they produce. It appears probable likewise that Pennsylvania consumes 40,000 more horses than she produces, costing at least $4,000,000.

Buffalo is said to have handled 400,000 horses in 1904. One firm which handled 17,000 horses last year tells me that approximately 15 per cent. weighed more than 1,500 pounds, 15 per cent. weighed less than 1,200 pounds, leaving 70 per cent. between 1,200 and 1,500 pounds. It is safe to say, therefore, that at least three-fourths of these horses possessed more or less draft breeding. I am told the horses received at Buffalo come principally from the North Central States, including especially Iowa, Ohio, Illinois, Nebraska, Kansas and the Dakotas.

From this presentment, it might appear obvious that the farmers of the North Atlantic States, including those of Pennsylvania, should engage more generally in the breeding of horses and especially of draft horses. I believe this is true, but I wish the demonstration was more complete. Certainly farmers of these States should raise more draft horses, unless they cannot raise as good draft horses as their western neighbors, or unless they can make more money doing something else.

## Draft Horse History.

We began actively to breed draft horses in the United States about 50 years ago. These operations began in Central Ohio and have moved westward until the whole of the Central West has become permeated with horses of draft breeding. During the half century that has elapsed. the draft horse has appeared unable to make its way eastward to any considerable extent except to be consumed. Has this been due to habit or to the lack of suggestion? Has the accident of introducing the draft horse into a pioneer country been the cause of its western development? Have the eastern farmers been making so much money during the half century that they could afford to allow the Western farmer to supply the needs of our Eastern cities with draft horses. not to mention other classes of horses? Or is the reason more fundamental?

One thing is certain, that the phenomenal development of the Central West has been in larger measure related to the application of efficient motive power to the production and marketing of farm crops. The draft horse has been a factor in this development. The efficiency of the horse as a motive power has been raised to such an extent as

to reduce the number of horses required to do a given amount of work. It may be questioned whether the increase in efficiency of the horses of the United States has not been a greater factor in influencing the number of horses required than all the railroads, trolley lines, automobiles and bicycles. It is interesting in this connection to quote an item which appeared recently:

"The New York subway, which is carrying three hundred and fifty thousand passengers a day, has not decreased the travel on the elevated railroads, and has affected only slightly that on the surface cars." The new East River bridge which was opened to car traffic a few weeks ago carries crowded cars, and yet the traffic on the old bridge remains practically unaffected. Here are two cases in a single city which prove what observers have long known—that every improvement in transit facilities increases the number of people who will use them, or rather, the same people will ride more when they can ride easily than when the accommodations are inadequate.

## Advantage of Heavy Horses.

Whatever may be the condition in the past we must face the facts as we find them. I believe that the eastern farmer would do his farm work more efficiently and more economically if he had larger horses. I believe it would pay some of these farmers to supply the eastern market with high class draft horses. It should not be forgotten, however, that the problem is one of considerable difficulty. If a farmer desires to raise beef cattle or dairy cattle or mutton sheep or fine wooled sheep, he has only to buy the necessary females and a sire and proceed to realize his ideal. As every one knows, in the breeding of horses the farmer cannot cope with the situation individually. In most sections of the Eastern States the chief motive for keeping stallions comes from the patronage of men who breed horses for pleasure and sport. I am not condemning this situation, but it fails in many cases to meet the farmer's real needs, although doubtless he too often breeds to these stallions through the same sporting instinct.

If breeding of draft horses is to be started in a section not heretofore breeding them it should be done by co-operative effort. The farmers of a section should thoroughly canvass the situation as to the desirability of the project for their particular territory. If it is deemed desirable they should enter into an agreement to breed draft horses for at least ten years. Then they should secure a stallion by co-operative effort, not for the purpose primarily of profit from service fees but to make sure of a consistent line of breeding. Unless a neighborhood can enter into the business systematically and thus make itself the center for high class horses, it had better turn its attention to some other business. It must be remembered, also, that unless the neighborhood already has high class draft mares, it will be several generations before the progeny can compete with Western draft horses. If a farmer were assured that for ten years he would have a draft stallion at his service, there would be some incentive to secure high class draft mares. At present no such incentive exists.

Leaving now for your discussion the possibility and propriety of breeding draft horses in the North Atlantic States and particularly in your own State, let us turn to the question of the conformation of the draft horse. And before proceeding to discuss the draft horse as he actually exists in the United States, permit me to present some theoretical considerations which should guide those who develop the draft type. For greater ease in following the discussion, I hand you a score card used in teaching students to become acquainted with and to judge the different types of horses.

## Form and Purpose.

Horses are used either for force or for speed, or for both. In every horse, both motion and power are essential but in varying degrees. The thoroughbred and the modern trotter hitched to a pneumatic tire sulky are types of the horse used for speed almost exclusively, while the Shire and the Boulonnais are types in which speed is largely subordinated.

The horse, or other animal, is a complicated system of bones, which act as levers and to which power is transmitted through the muscles. The well known principle of physics that "force cannot be gained without loss of speed and that speed cannot be gained without loss of force," applies equally to the leg of a horse and the drive wheel of an engine. While we may have a fair degree of both force and speed in one animal, we cannot have extreme speed without some loss of force. nor great force without some loss of speed.

If we could have a horse rigid and suspended from the back by a string, we would find a point where the horse would balance. If we should again suspend him from the breast and also from the side, we should find two other such other such points. The point at which these three lines would meet would be the horse's center of gravity. The more stable the horse, the greater the force; the less stable the horse, the greater the speed. The lower the center of gravity, the wider the base represented by his four feet, and the more nearly the center of gravity lies in the center of this base, the more stable the equilibrium, consequently the greater the force. On the contrary, the higher the center of gravity the smaller the base and the farther forward the center of gravity the less stable his equilibrium and the greater his speed. In other words, a tall horse does not run fast simply because his legs are long, but because his center of gravity is high and his equilibrium unstable.

This fact is well shown by the difference in speed between running, pacing. trotting and walking. In running, the horse's equilibrium is the most unstable because his feet are entirely off the ground at certain times—hence the horse is required to make greater effort to restore his equilibrium. This causes him to go faster. In the same way, the equilibrium of the pacing horse is less stable than that of the trotting horse because in pacing, the two feet on one side of the horse are taken off the ground at the same time and the center of gravity consequently falls entirely without the base; while in trotting, feet on opposite sides are taken from the ground at the same time and the center of gravity is almost in a straight line between the two feet which remain on the ground. The pacing horse, therefore, is required to make greater effort to regain his equilibrium and in consequence goes more rapidly than the trotter. In walking there is never less than two feet on the ground at any time and part of the time there are three.

### Force and Speed.

For force, we must have weight in order that a sufficient resistance may be offered to the load which it is desired to move, and also that we may have muscles and bones of sufficient size to obtain the requisite power. For speed, on the other hand, we must have long bones and long muscles in order to have quick motions. A horse that is low and massive also has the bones of his members at a more advantageous angle for force, that is to say more nearly at right angles with one another, while the horse that is high has the bones of his members at a wider angle which is more advantageous for speed.

By attitude is meant the relation of the feet and members to the body. It is obvious to any one who stops to think about it, that the best position for a milk stool is when the bottom of the leg is directly under the top of it, in other words, when the leg of the milk stool is vertical. If it happens that the leg of the milk stool is crooked, it does not change the fact that the bottom end of the leg should be directly under the top end and that the seat of the stool should be at right angles to a line drawn from the top end to the bottom end of the leg. The same mechanical principle applies to horses. The most advantageous position for the feet of the horse is when they are directly under the points of attachment with the body. If the front feet are farther under the body than this, more of the weight of the body is thrown on the front feet and more strain is thrown upon muscles in holding the horse in this condition. Such a horse is likely to likely to pound out his front feet too quickly. On the other hand, if his hind feet are too far under him, too much of the weight is thrown upon the hind members and too much force is required of the hocks. Consequently, the horse is liable to injury at this point. Ordinarily, five-ninths the weight of a horse is carried on his front feet and four-ninths on his hind feet. If a plumb line is dropped from the point of attachment at the elbow, the line should just split the knee and pastern joint and touch the ground at the heel of the horse's foot. Likewise, if a plumb line is dropped from the buttock, the line should just touch the rear of the hock and pass parallel and just against the rear edge of the cannon. When viewed from the front, a plumb line dropped from the point of the shoulder will pass directly in front of the middle of the knee and foot. Under these conditions the feet will be usually just far enough apart to allow the placing of another foot of equal size between them. When viewed from the rear, a plumb line dropped from the point of the buttock should pass directly in the middle of the hock and pastern joints. The hind feet under these conditions will be usually just far enough apart to allow the width of the hock to be placed between them. Such an attitude means that the fore arm and all the cannons will be directly vertical. A horse should have this conformation without reference to the purpose for which he is to be used.

### Horse Proportions.

In the study of animal proportions, it has been found desirable to adopt some unit of measure. In considering whether a horse has a proper proportion, it is not entirely a question of how many inches high or long, how long the shoulder or neck, or how wide the breast and hips, but it is a question of how the measurements are related to one another. Careful investigation has shown that the length of a horse's head, i. e., a straight line from the lips to the top of the poll, obtained by a compass, not by a tape line, possesses the elements necessary for a unit of measure. It has been found further that there are a number of measurements of a normal, well proportioned horse to which this unit of measure applies. For example, the height of a horse at the withers is two and one-half times the length of his head. If the height of the horse is more than two and one-half times the length of the horse's head, the head will appear small or the horse set up on stilts. If the height is less than two and one-half times the length of the head, then the head appears large and ungainly or the horse is unusually close to the ground.

The ideal distance between the point of the shoulder and the point of the buttock, i. e., the length of the horse's body, is the same distance as the height of the horse at the withers. Except for the head and neck, an ideal horse stands in an exact square. The horse is distinguished in this respect from the ox, which is generally about 20 per cent. longer than it is high. This accounts for the fact that an ox can pull more for its weight but does not have the speed of the horse. The length of our draft horses, as well as our trotting horses, generally exceeds their height by one or two inches, while the height of the thoroughbred and saddle horses sometimes exceeds their length. While it is true that our draft horses, on an average, are slighty longer than their height, our best types approach the square very closely.

The significance of the length of the horse depends upon the proportion of the shoulder, back and croup. If the length is obtained by long, sloping shoulders and a long, horizontal croup, extra length need not alarm us, but if this extra length is to be found between the rear angle of the shoulder blade and the hips, the conformation is not desirable.

The distance from the rear of the shoulder blade and the point of the hips should be in a well coupled horse the length of the horse's head, while the length of the croup is about two inches less. Draft horses, which have been worked for some years, will have the back somewhat greater because of the straightening of the shoulder, incident to the pressure of the collar. It may be here noted that the reason for a stout back lies in the center of gravity is thereby lowered and thrown backward nearer the center of the base.

### The Actual Draft Horse.

So much and too much of the theoretical draft horse! What of the actual American draft horse?

It has come in my way to make a good mny measurements of draft horses, including imported draft stallions. It occurred to me that a study of the conformation of draft horses, as found in actual use would be of interest and perhaps of value. I, therefore, set a student at this work.

The census of 1900 allows Columbus, Ohio, a population of 125,560, and it has risen to the dignity of suburbs. It is a town large enough to support important breweries and transfer companies, in which the keeping of fine draft horses becomes a matter of advertising as well as pride. Mr. A. H. Snyder, of the class of 1901, Ohio State University, measured one hundred and one of the best and largest draft horses to be found in as compared to the running horse, so that in trotting horses, long, weak backs are often found. The bicycle sulky has been the means of increasing the speed because it has reduced the power required, but has resulted in breeding the trotter farther away from utilitarian purposes.

The stoutest croup is a sloping or vertically inclined one, and shortness is no special detriment for. force, provided the muscles are large. The long, horizontal croup gives the most speed and the best action; because the muscles are longer; the hind members are longer in proportion to the height of the horse, and because the propulsion is more nearly in the direction in which the horse is going. Inasmuch as the market demands considerable action and some speed, even in its heaviest types, the draft horse with a long, horizontal croup brings the most money, although this conformation causes loss of power.

Among the other lengths of a horse which are the length of a horse's head may be mentioned:

(1) Length of the neck from the poll to the center of the insertion at the shoulder.
(2) From the back to the abdomen.
(3) From the top of the withers to the point of the arm.
(4) From the superior fold of the stifle-joint to the point of the hock.
(5) From the point of the hock to the ground.

It may be useful to know, also, that the width of the head from the forehead to the angle of the jaw and the width of the neck at the junction of the head, should both be the same and be one-half the length of the horse's head.

The length of the shoulder is not, in itself an important consideration for greater strength.

### The Shoulder.

The shoulder of a draft horse should present the proper direction for the collar; the proper angle with the arm, which should approach a right angle, and should be heavily muscled. For speed, long sloping shoulders are desirable, with the arm in a vertical rather than a horizontal position. This conformation gives the longest muscles; gives the greatest elasticity, and places the point of the shoulder the farthest in front of the foot, when the latter is upon the ground; enables the foot to be extended more horizontally, and hence is longer in coming in contact with the ground.

With long, sloping shoulders and a long, horizontal croup go long, sloping pasterns. Long, sloping pasterns give greater speed because the power arm of the lever is shorter, as compared with the resistance arm, and give greater elasticity and therefore reduces the severity of the concussion. As before stated, draft horses are needed for speed and action, as well as for draft. Sloping shoulders and the sloping pastern also reduces the concussion and thereby increases the life of the horse upon the hard streets. It comes to pass, therefore, that draft horses are liable to be too straight in the shoulders, too straight and too short in the pastern, and too steep in the rump for the market demands, and what is a virtue from the standpoint of securing extreme power becomes a fault when considered from the standpoint of the market demands.

In this connection, it may be stated, that the upper and lower angles made by the segments of each limb, is larger in the draft horse, while the intermediate angle is smaller than in a horse for speed. This conformation gives the most advantageous insertion of muscles on the bones for force and also, on the whole, brings the horse nearer the ground, thus lowering his center of gravity. The depth of chest of a draft horse approximates the distance of the chest to the ground, although the latter distance in the average American draft horse appears to be about one inch greater than in the depth of chest, while the average of thirty-two American standard bred trotters, as measured by Messrs. Johnston and McClelland, class of 1899, Ohio State University, shows a difference between these two measurements of over six inches.

The length of neck in a horse for speed is of prime importance because it gives him great facility in the use of his head, which, when he is in motion, is used for precisely the same purpose as a tight rope walker uses his balance pole. An ideal position for both the head and neck is an angle of forty-five degrees with the horizon, which makes the angle of the head with the neck a right angle. This position of the head gives the best bearing for the bit; gives the driver the best control of the horse; places the eyes in a position to see the road at the most advantageous distance, and gives free passage of air through the trachea. In a horse for extreme speed, where the track is smooth, the head may be held in a more horizontal position, because it raises the center of gravity and throws it forward, thus making the equilibrium more unstable and thereby, as heretofore explained, increasing the speed. For power alone, however, the length of the neck is not important, provided it is well muscled and the head may be held lower and in a more vertical position because the fact that it is a means by which the propelling power of the hind members is conveyed to the collar If the back were a rubber tube, it would collapse. No more propelling power can be exerted by the hind members than the back is capable of conveying. This stoutness of back and this power of conveying force, be it noted, should come as far as possible through the shortness, width, and thickness of loin and through the width and muscles of the back, rather than through the shortness of the back proper. That is to say, the chest, which the back proper bounds, should not be unduly shortened lest the lung and heart power be reduced. Well sprung ribs extended well back, making the distance from the point of the shoulder to the last rib long, is desirable, because this is the boundary of such vital organs.

In the draft horse, some concessions, to be sure, may be made for the purpose of increased strength. In the trotting horse, having only a bicycle sulky to pull, great heart and lung power is essential; greater speed at the trot can be obtained, also, by greater length between fore and hind feet, the city. All told, nearly two thousand measurements were taken. I have every reason to believe that the work was intelligently and carefully done. The one hundred and one horses measured were classified by the owners or stable foremen into: Extra good heavy draft horses, 55; medium good heavy draft horses, 17; extra good light draft horses, 16; medium good light draft horses, 13. The following table gives a summary of some of the more important measurements of the fifty-five considered extra good and of the seventeen considered only of medium value for heavy draft purposes, and also gives a few comparisons of average measurements of the thirty-two standard bred American trotting horses:

| | Extra Good Dft H's | Medium Good Dft H's | Trotting Horses |
|---|---|---|---|
| Number of horses measured ..... .... | 55 | 17 | 32 |
| Weight ....... ...... | 1,613 | 1,579 | |
| Height at withers.... | 66 | 67.12 | 61.7 |
| Height at croup ..... | 65.6 | 68 | 61.6 |
| From point of shoulder to point of buttock. | 67.8 | 68.75 | 62.8 |
| From lowest point of chest to ground.... | 33.5 | 34.12 | 34.9 |
| Circumference of body at girth ........... | 90 | 87.8 | 70.5 |
| Circumference of front cannon at center .. | 9.66 | 9.75 | |
| Length of head ...... | 26.66 | 26.8 | 24.6 |
| Length of shoulder... | 27.25 | 27 | 23.9 |
| From dorsal angle of scapula to hip ..... | 30.4 | 31 | 28.5 |
| From point of hock to ground ....... ..... | 25.5 | 25.9 | 24.0 |
| Width of chest ...... | 20 | 19.5 | |
| Width of hips ....... | 25.2 | 25.12 | |
| Length of croup...... | 22.5 | 22.75 | |

We have in this table a composite picture of the two types. Comparing these composite pictures, it is found that the extra good heavy draft horse compared with his less valuable brother, is not so high for his weight; is deeper in the chest; shorter from the chest to the ground; larger in the chest girth but slightly smaller in bone. Compared with the length of the head, the shoulder is longer, the back shorter and the hock closer to the ground; the chest and hips are slightly wider, while the length of the croup is slightly less.

Confining ourselves to the fifty-five horses considered extra good heavy draft, their weight in working condition varied from 1385 to 1930 pounds; the height varied from 15½ to 17 hands 1½ inches; the girth varied from 84 to 99½ inches, while the circumference of the cannon, midway between the knee and fetlock, varied from 8¾ to 10¾ inches. Of the 101 horses measured only two measured more than 98 inches around the girth and only five measured over 94 inches.

The composite of an extra good draft horse, as found in use on the streets of Columbus was a horse weighing a little more than 1600 pounds, 16½ hands high, measuring 90 inches around the girth and 9¾ inches around the cannon, at its center.

Horse breeding is confessedly the most haphazard of any of our breeding operations. The circumstances under which cattle, sheep, and swine are bred, require the breeders to give the subject constant and intelligent consideration. The result is, he has a more or less clear ideal towards which he is breeding and he mates his sires and dams for the purpose in view, recognizing that "As a man soweth, so shall he reap." In a large proportion of cases, the type of horses which a farmer breeds is largely an accident. He seldom has any very clear idea of the market demands.

It seems to me that having determined, by careful investigation, the types most in demand either at home or abroad, a campaign could be begun to educate the farmer in the type desired. For example, a placard, containing an outline of the type of horse demanded by our foreign markets for heavy draft purposes, might be prepared on which were some of the measurements which such a horse should possess. Set the average breeder of horses to applying these measurements to the horses he is breeding and you would have an education in type, which would be most marked. It is, of course, freely conceded that a horse might have all of these measurements and be worthless,—quality, style, action, temperament, and soundness are, however, already recognized as matters of importance.

The important thing at present is to teach the raiser of horses that these things must be accompanied by certain conformations in order to be adapted to market demands. We will never reach our goal, unless we work towards a definite ideal.

# MANAGEMENT AND FEEDING OF BREEDING SWINE

By Hon. A. J. Lovejoy, Roscoe, Illinois.

I was somewhat surprised that you sent away out to Illinois to get a man to talk about the hog. I thought you had better hog men here.

## The Breeding and Selling of Pure-Bred Swine.

To some men the breeding of swine is looked upon with disfavor if not with absolute disgust, yet the hog is known over the entire world and is confined to no one part in particular.

He is the animal which the ancients sacrificed to the Goddess of the Harvest, (Ceres). He is also—as the Irishman says "the gintilman that pays the rint."

The utility of the hog is in a great measure owing to its remarkable fecundity, reproducing at the age of one year and bearing from five to ten at a time and often more. While I am a believer in prolific strains and would favor sows that produce good litters I am not a crank for extra large litters and think that litters of six to nine are better than from ten to fourteen, as I believe that the sow can raise the former number better than she can the latter that the former litter will bring more money from a breeder's standpoint than the latter. I am somewhat like the professor who began farming and stock raising and always did everything according to the book, having a book on cattle, hogs, horses, sheep, and poultry. He always consulted these books before deciding any matter regarding them. One day his man of all work came running to him in great haste saying "Prof. that old goose out in the barn has 16 goslings, what shall I do with her?" The professor immediately consulted his goose book and said: John; go right out and kill seven of those goslings as no goose can suckle more than 9. This is the reason that I do not care for extremely large litters, as I wish every pig to do his very best.

## The Hog as a Source of Income.

The hog has been a reliable source of revenue on the American farm since the earliest recollection of man. In olden times every farmer kept but a few hogs while the laborer in the village, or the mechanic, or the Irishman on the section each kept his pig to consume the refuse of the kitchen and garden, and to supply his family with that choice old fashioned home made sausage, ham, and head cheese, as well as various other products, while at the present time the uptodate American hog supplies in his various products the wants of the people of the entire civilized world, not only with choice bacon and hams but with lard, lubricating oils, combs, brushes, knife handles, buttons, and ornaments of many kinds. Even the blood and bristles are all saved; the blood with scraps of meat and bones is used in the manufacture of Blood Meal, and Tankage. The Blood Meal being a good feed to combine with other feed for young calves, while the tankage is used for combining with meal or other feed for the growing of pigs. I wish here to say a few words regarding the use of this Digester Tankage as it is called. It is composed of blood, bones and meat scraps thoroughly cooked and dried then ground into a fine meal, and it contains 58% protein or bone making material and for the purpose of making growth in young pigs is even equal to or better than milk. We in the west have no milk to feed or at least we at home do not and for a number of years have used Tankage instead and with good success. In a feeding test at the Iowa State Ag'l College, several lots of pigs of same average weight were fed various kinds and combinations of feed and made the largest gains as well as the cheapest on a combination of 80% corn meal and 20% tankage. We use tankage combined with wheat middlings or with ground oats and corn meal and find it a satisfactory feed for rapid growth, as well as a good flesh former. You will note that there is no waste in the present day methods of slaughtering swine and when a hog has passed through one of our great slaughtering establishments there is nothing wasted except possibly the squeal, and I have heard it stated that even this was preserved by the phonograph

You also often hear the remark "as dirty as a pig." This is a villification of the animal that Franklin's colored servant said was "the only gentleman in England" from the fact that he was the only animal in that country that did not have to work for a living. It is a well known fact that in most respects the hog is the most cleanly of our domestic animals, and unless confined to very close quarters, will always keep himself and his bed clean. In this respect he is much more cleanly than the horse or the cow.

It has been said that "the hog is a machine that oils himself, puts ten bushels of corn in to a less space than a bushel basket, and in doing so doubles its value, then can carry it to market on his back. Corn, barley, oats, rape, clover or any of the products or by-products of the farm loaned to a well bred hog is money at big interest, in fact the hog may be called a mint. The corn, grasses, etc., the bullion, which put into the hog is transmuted into coin; it is an honest mint and gives 16 ounces avoirdupois of edible meat. Properly bred, fed, and intelligently handled this autocratic porker will pay off our debts, place a piano in the parlor, a carriage at the door, and furnish the cash to send our boys to the agricultural college, and make better farmers and stock breeders of them.

### Market Demands.

The market of the present day demands quite a different weight of hog than in former years, and yet almost any kind of a hog will bring ready money, but not all with the same profit to the grower. The most profitable hog for the general farmer to raise is the one that with good care and feed will reach a weight of 225 to 285 pounds in the shortest possible time, and at the least cost to produce. To do this he must be a pig of good length of body, well bred, a good feeding type and must make a portion of this weight on grass, rape or clover. There has been of late years a great hue and cry about the bacon pig and there are men who would have us go back to the type of the Razor-Back by trying to convince us that the Tamworth is the only hog for the farmer. He may be a good hog for some countries but in the west he is not looked upon with favor. When the markets of this country demand a bacon type of hogs they can be furnished by selecting the more rangy types from our present popular breeds and by a system of feeding they can be brought to the bacon standard, but till the markets will pay a premium for this type of hogs, the farmers—especially of the corn belt—will continue to grow the quick early maturing type of hogs that are always ready for the market from three months of age up. This type of hog furnishes good bacon and hams as well as lard and other meat products. Speaking of hams and bacon it is said that "the principal reason our hams are discriminated against in the English markets is because of their better quality and that they can be sold there cheaper than those produced in their own country."

### American Pork Products Abroad.

It is a recorded fact that the highest priced pork products sold in Ireland by the Limerick dealers, was put up in Chicago, and by special instructions marked with private brands of Limerick dealers, who for years have been selling American hams and bacon on the continent as "Best Irish Hams and Bacon."

The authority for this may be found in the Consular reports Nos. 122 and 129. It is also a matter of record that the Bacon Curers' Association of Great Britain, who prosecuted the Junior Army and Navy Stores of London for selling American hams for Irish, secured a fine and costs amounting to $360. Investigation showed that the American hams were changed to Wiltshire by oiling and rubbing them with meal, then branding "Best Wiltshire" they were put on the market as genuine Irish product and brought 24 cents lb., while the remainder of the identical shipment sold for 17 cents lb., as American product. This is sufficient evidence that all the American farmer needs to do is to keep up the quality of his product and the English market is assured. It would thus seem that we do not need any special bacon type of hogs to produce the highest quality of product.

While I am an advocate of the early maturing breeds, I want a pig that will make 225 pounds at six months of age when properly fed, or 250 to 285 at eight months of age for the market, and I want him of such conformation that he can be made much heavier when pushed for the show ring. Or one that when in shape will at one year of age weigh 500 pounds. Or at maturity will weigh 800 pounds or more.

We have in our own herd even greater weights, having a boar that at 16 months weighed 740, and another that when shown in his yearling form weighed 787, and also a two-year-old that at St. Louis this year weighed 926, and could have been fed to 1100 pounds very easily, in fact we had to hold back the feeder who wanted to make him weigh more. This early maturing type that with present conformation can at maturity be made to great weights is the result of years of selection and good breeding and feeding.

So much in general regarding swine growing, now how are we to produce the best and most profitable kind of hags. This can only be done by using pure-bred sires, and still better if we use pure-bred dams as well. This brings me to the subject of my paper.

### The Breeding and Selling of Pure-bred Swine.

I have no ax to grind as to what breed a man should breed, will only say that a man who wishes to commence the breeding of pure-bred hogs should select the breed that he likes best, and that is best adapted to his part of the country. We have been breeding but one breed for about 30 years. We commenced with the Berkshires and have never had any reason to change our breed. We commenced at the bottom, and almost below the bottom, and in a very small way commenced what has become our life business. It has been a somewhat slow gait, but have kept at it till we now enjoy a national reputation and trade. Not only shipping pigs and hogs to every state in the Union, but annually shipping to foreign countries.

The route has not always been strewn with roses by any means, but has been rugged and quite rough at times, and when I glance back over the 30 years I almost wonder that I never gave up. I was looked upon as one who was "batty" for paying what I did for my first pair of pigs, and was the cause of many slurring remarks in my early days for trying to raise better pigs than the scrubs of our neighborhood, yet this had no effect on me or my purpose and I simply grew in the business as I grew in knowledge regarding it. I well remember how I first made my appearance in the show ring. It was at the Illinois State Fair, where I first went to conquer, but like many others I met the enemy, and was his. It was there that I first met your worthy President, Mr. W. C. Norton, and will never forget how my heart sank as the judges passed my pens only to glance and then go on and place all the blue ribbons on the Norton herd. While I then saw all my hopes go a glimmering, I did not give up nor did I abuse the judges or the Fair Association, but made up my mind to come again another year, and to come a little stronger, and in this way as the years came and went, I began to see that there was something in the future, and as I began to generally get inside the money in the prize list I was encouraged to still further efforts till after a few years we began to get at least our share of the blue ribbons at the leading shows, and thus for some 15 years we followed the great shows and finally at the World's Fair at Chicago in 1893, we met and defeated both England and Canada, as well as America, by winning the championship herd prize for the best herd of Berkshires over one year old. This gave us such a boom that we have never been able to fill our orders since, and have never made a general show since, and have made but two single entries at any shows since. We sell many show hogs and pigs each season which go into the hands of prominent breeders throughout the country, and we like this better than to follow the show ring ourselves.

You may say that all this hard work and time is too much to give to the breeding of hogs, but how can any business be built up without hard work and lots of it? Any one that is really interested in the work can do fully as well if he will enter the business with a determination to stick to it.

### How We Handle Our Hogs.

Many breeders use a building called a hog house, where the whole herd is kept. Our method is very different and we prefer the individual house with plenty of yard room, so we took a field of clover of 20 acres and fenced a narrow lane through the center, and then divided the ten acres on either side into lots of an acre each, and put a little house 8x8 square in each lot. All fences are of woven wire 30 inches high and each lot is an acre, and each lot contains a sow and her litter, thus giving her plenty of room for the much needed exercise, and all the grass she and her litter can use, and more, too. These houses are all neatly made and set in rows and are all painted alike and the field looks like a little city. Houses are all numbered. Houses are built double boarded with four-inch air space between walls, and well ventilated, and are plenty warm in winter and cool in summer.

The sow and litter are fed here till pigs are three months old, when the sow is then removed and the pigs remain till shipped out on orders. By keeping but few together in this manner we can make a better growth than when 50 to 100 are fed together, and there will be no runts among them. When the pigs are old enough to need separating we assort them and place all boars by themselves on one side of this lane, and all sows on the other. All pigs not good enough for shipping to breeders are fed for the market.

We feed with a horse and a low wagon only one foot in height, and feed is dipped out from the barrels with a long handled dipper, and it is really but little work to feed one or two hundred pigs in this manner, being easier than carrying a pail of feed in a hog house. We are satisfied that we get better results in this manner than if we kept 100 to 200 hogs and pigs in one house, besides giving them all the advantage of grass and exercise. We feed everything quite liberally, and when the young pigs are about three weeks of age and begin to show signs of wanting to eat with their mother, we have a platform 16x16 in the corner of each lot where the litter may go and eat by themselves unmolested by the sow, and in this way we help to push them along till weaned, when they are well on feed and growing rapidly, and never have any set-back when the sow is taken away. We often have letters asking the price of pigs 6 to 8 weeks of age. We always answer that we do not price any pigs so young, for the reason that a pig taken from its mother at 6 to 8 weeks and shipped to a distant state will certainly get a set-back or check in growth, and growth is what we all want and as much of it as possible by not sacrificing quality, and to get this we must have no check while young. There are many things to be considered in establishing a herd of pure bred hogs. First, one must have a taste for the business, and next he must have a discriminating judgment, in selecting his breeders, and then he must make up his mind to give close attention to all details. Start with as good individuals as he can afford to buy, and as well bred as can be. Besides all this he must be a good feeder, and always have in mind that there is nothing too good for his pigs. He should note carefully each day, and each time he feeds whether every pig is coming to his feed with a relish or whether only mincing a little and feed only what will be eaten with a relish and eaten clean. Never let a pig be fed so that there will be feed left in his trough after he is done. The feeder should also note the condition of every animal and keep a watch out for lice, or other little troubles, and if he finds that his pigs are lousy he must commence at once and in earnest to rid them of the vermin, or he will soon have a very unthrifty lot of pigs. Some make a practice of sprinkling their pigs with different remedies for this trouble, but one cannot do the work thoroughly enough by sprinkling, and should instead dip them, so that every part of the body will get the benefit. For this use we use a regular dipping tank, about six feet deep and much longer, and set it in the ground so that the top is only a few inches above the level of the ground, and build an incline in which the pigs are driven up till just at the end of the tank, where they slide down and are entirely covered with the dip and have to swim out at opposite end. This dipping should be done if the herd is troubled with lice as often as once a week for three or four weeks, and after this an occasional dipping will keep them free from the pest. We use a dip made for the purpose by the Moore Chemical Company, of Kansas City, Mo., and find it the best thing we have tried. Zenoleum is also a good remedy. Crude petroleum is also a sure remedy if it can be purchased reasonable. A kerosine emulsion is also very good. The dipping of the whole herd will pay well if for no other reason than that it makes them thrive and keeps hair and skin in fine condition. There are many little pig troubles that can easily be overcome if attended to in time. Many times you will hear the pigs coughing, this is often caused by the little thread worms in the throat and also by the stomach worms, either of which may be easily removed. We use for this purpose the same Moore's Hog remedy or crude dip and put about a pint to a barrel of slop feed, and if this is used twice a week you will hear no more of the cough, and then continue once weekly you will never hear any more. We have not heard a pig cough on the farm for several years.

A matter of considerable importance where pigs are fed heavily is the benefit derived from feeding charcoal. In our country where corn is plenty we burn all cobs, and for this purpose we built a pit about as you would build a cistern and walled it up with stone, and by starting a fire at the bottom and filling in with cobs as they come to a red glow and continue this till the pit is full, then pouring over the whole a barrel of water with salt added and covering the pit tightly with the sheet iron cover to keep out the air, the whole will form as good a quality of charcoal as can be, and one would be surprised to see the animals leave any kind of feed and heartily eat this charcoal. We burn all the cobs from the corn raised each year. and you will never find any lying about the feed yards, in fact, we seldom feed whole corn anyway, but grind all and mix with other feeds.

In breeding pure bred hogs there is another matter that should be attended to and that is the marking of the different litters. so that no mistake can possibly be made in identifying each pig.

We have tried all kinds of ear labels, but as yet have found none that are satisfactory, and years ago commenced the system of marking with a harness punch by making a little half-round hole in rim of the ear. We can in this way mark them so that a hundred or two may be marked and without disfiguring the ear if properly done.

When a pig is ordered he is selected and his ear mark taken and entered on our book of blank pedigrees, and it is then easy to turn to his dam and see what his sire was and all about him and his pedigree can be made and made correctly. Careful attention in the matter of keeping correct records of all breeding ages and number in litter, that no error can be made will have much to do in the future success of the business. All letters received should be answered promptly and a carbon copy of each should always be made and filed with every letter received, that one may know what he has written. This alone is a very important matter, and will save many misunderstandings. Many men who write for a pig do not do this, and after a week would not know what they had written. We have filed where we can get it in ten minutes every letter received in twenty years, as well as the answer to it. and we never have any misunderstanding with any one over what he ordered.

## Selection of the Brood Sow.

When you go out in the lot to select a few more sows from your herd to use for breeders, do not always select the plumpest, fattest one that looks so nice, she will not make as good a mother or breeder as one that is a little longer in body or a little more motherly in her appearance. In fact, I would not select them till nearly or quite a year old. In our own experience we have bred very few young sow pigs and usually keep them till near a year old before breeding, believing that the selection of too young a sow and breeding to a young boar will not produce as good litters or as good pigs as when from mature or nearly mature animals. This I believe is one of the reasons of the general fineness and extremely small litters that are found in many of our herds to-day. It is not in accordance with nature. Many of the large growers of hogs in the corn belt of Illinois have made a practice for years of selling the brood sows each fall and selecting from the spring pigs a large number of young sows from six to seven months old, and then breeding to a boar of about the same age till they have reduced both the size of their animals as well as the size of the litters, and also the stamina of their hogs, and today are getting litters of two and three pigs instead of litters of five to ten good strong ones. In our own herd when we find a sow that is a good mother and raises a fairly good sized litter and takes good care of them, we keep her as long as she lives, unless some appreciative customer comes along and offers a tempting price.

We had a customer last month that came over a thousand miles to buy brood sows of us, and took three at from $200 to $250 each that were well along in years. Of course these sows were bred to a most remarkable boar, for which we paid $1,000 in cash, and is conceded by nearly every prominent breeder to be without an equal in the breed, and sows bred to him are in great demand from all parts of the country.

After the brood sows are selected and bred they should be fed with a view to the future good of the litter, and should have a ration that will produce bone, flesh and frame instead of fat alone, and for this a combination of feeds should be used, which contain the proper nutriments, such as wheat middlings, or what is known as ship stuff, or ground oats with cornmeal with a little bran, but under no consideration feed corn and corn alone, or your sow will, when she comes to farrow, bring a litter of weakly, squealing, puny things that will not have vitality enough to get to their dinner; and the sow herself will be feverish and likely eat every pig as it comes near her. Sows should, during the winter, have something to take the place of grass, and with us we can find nothing better than well cured clover hay or alfalfa, run through a power cutter and mixed with the feed or even fed separate. We also use some sorghum, which is relished by the hogs, and it is astonishing how much of these rough feeds a herd of 100 or more hogs will consume.

We used to grow sugar beets for this purpose, and they are a grand feed, but the farmer of the west will not get down on his knees and weed beets for hogs, or even for a sugar factory, and we have given it up.

## Selecting a Boar for the Herd.

It is said that the boar, bull or stallion is half in the matter of heading a herd or stud, and this is fully true, so when you wish a boar get as good a one as your purse will allow, and you will be well repaid. Good boars are eagerly sought for by all leading

breeders, so do not expect a world-beater for nothing. We have had letters asking for a pig that would score 100 points, and then some, and winding up with the words, "Remember, that I do not pay any fancy prices and will not give over $20 for such a pig as I have described." We generally answer this kind of a letter by saying that such a pig has yet never been bred, and when we get one we will use him ourselves. There are many choice boars that can be purchased reasonably, but real outstanding show boars or sows either, command good strong prices. We made a public sale of 47 head of Berkshires, varying in age from five monts pigs to yearlings, that made an average under the hammer of $107.76 each, and all were purchased by parties attending the sale, so that something like a hundred mail bids did not get an animal. I mention this simply to show that real breeders know the value of an animal when they see it, and it has been our experience that the best ones are the easiest to sell even at strong prices. We find in shipping pigs and hogs to the various States that the farther East we go the lower prices are expected; why this is, I cannot say. The South and West—especially the far west—will pay the longest prices for something that suits them. The demand for good Berkshires was never greater than now or during the past few years, and each year finds us sold out long before the orders quit coming, either for young pigs or for mature animals. One need never fear an over production, but rest assured of a market for all that are good enough to ship.

In the breeding and selling of pure bred swine, one must always do business on the square, for he cannot long do business any other way. It takes time and careful dealing to build up a good business, and when established he must continue the same painstaking methods or he will soon find his business leaving him, and when once it starts to other channels how very fast it goes, and he is soon without any. One should always make it a point to satisfy a customer if any complaint is made, for a satisfied customer always comes back and a dissatisfied one seldom or never.

## The Dark Side of the Business.

That there is a dark side to any business all must admit, and the breeding of pure bred swine is no exception.

One may have given his herd all the proper attention possible, had all sanitary conditions perfect, all feed just right, all little attentions given and some fine morning he will find here and there a pig that is "off his feed" and has that tired look and appearance, and showing symptoms of that dread disease known as cholera, or swine plague. We can all detect it at a glance, and it generally gives the owner symptoms of heart failure, too, unless he has a heart of steel, to see his whole year's crop drooping. He may try every one of the sure cures, and he will lose most of his herd just the same, as when the germ once gets into a herd they are a goner, or at least a large per cent. of them. After 30 years of experience I have made up my mind that I know as little regarding this disease as when I commenced and have tried all the sure cures without any success. We have found the very best thing to do when disease breaks out is to separate the well ones and remove them to fresh pasture where they cannot come in contact with any that are ailing, and take off the feed. The less sick or exposed pigs are fed the better. We have had three outbreaks during our years of breeding, and the last time we had trouble we had heard so much regarding Dr. De Vaux and his Anti-Toxin that we at once wired him on the very first signs of trouble to send a Vet, and Anti-Toxin enough for our herd, and he did so. When the Vet arrived he looked over the entire herd and said to us that there was no cause for alarm, as but seven showed any symptoms, and these were far from the rest of the herd. We said go ahead, and turned him loose with a good man to help him, and he commenced by innoculating the well ones each day for five days, assuring us all the time that this would certainly immunize them. Well, on the fifth day they all commenced to die and died like flies before a freeze, and the Vet. remained till 151 of them had died and then he had business somewhere else. The balance that were not immune from former outbreaks also died along during the winter. A few always pull through and these are worth their weight in gold, as they will never take it a second time. We have learned some things regarding this trouble, and one is that a sow that is carrying a litter when the disease breaks out, if she lives through and does not lose her litter, it will surely be immune from future attacks. We try and make it a point to keep all sows that pull through, as well as what breeding boars we have. In this way one is never entirely wiped out of business. I have a friend who was prevailed upon to purchase some sure cure, and finally did so, but it was to be shipped to him at a station that was eight miles from the farm. After a time the agent called upon my friend again and wanted a testimonial regarding his cure, and my friend said he was ready to give him one, and did so, saying, "I have not had any disease in my herd since purchasing your remedy, as it is at the station where it was shipped eight miles from the farm."

I will bring my paper to a close by saying that there is something about the breeding of pure bred hogs that to me is very interesting. The study of making certain matings and noting the results, is decidedly interesting. Animals are like clay in the hand of a moulder, if one likes the study he can almost mold the living form of animals to his notion if he keeps at it, and in a series of years he can have a herd of hogs that that will be a model, if he has the right model in his mind at the start. The breeding of swine, whether for the market or for breeding purposes, if earnestly followed for a series of years, will prove the most profitable for the amount invested that one can go into. The old saying that for big money breed horses, for sure money breed cattle, and for quick money hogs is still true and in my opinion the breeding of hogs comes near combining all three.

## DISCUSSION.

Q. What kind of grass?

A. Clover when we started. Now only bluegrass.

Q. How do you water your hogs?

A. Water from a well at noon each day with this same wagon. No running water. I am a little afraid of water coming from other farms; disease germs get in the water.

Q. What protection do you give your hogs during the winter?

A. We use these same houses; they are built double, lined with building paper between. The north door is shut; the south door is left open during the day. After they have all gone in at night we step out and close the doors if it is cold.

Q. Do you put several in those houses?

A. Sow and litter or three, five or eight pigs, according to the size of pigs.

Q. What is the size of the house?

A. Eight feet square.

Q. What kind of boards?

A. Flooring, matched.

Q. Are they on the floor or on the ground?

A. On the floor, bedded with nice dry rye straw, swept twice a week and rebedded.

Q. Are they comfortable?

A. Yes, very. I set them in rows of ten each in the field just as straight rows as a row of corn would be. There is a little woven wire fence in between. That keeps them separated in one-acre lots.

Q. Do you have two litters a year?

A. Sometimes if sows farrow early. In our business we have to have pigs coming nearly every month of the year for the reason that we have calls for all ages. If I were growing for the market I would try to have the pigs come in March and August.

We had a litter farrow on the 22d of December with the thermometer 22 below zero; we hung a lantern in the pen and it was just as warm as a bed-room.

Q. What is the height of the house?

A. We have twelve feet slope come up together at the top with the exception of about two inches for ventilation. This opening covered with inverted V-shape trough over opening.

Q. What do you do about the spread of the cholera?

A. I don't know that your state has done anything to provide any means for the protection of hog growers. There is no doubt you have thought of this matter. We use all the means we possibly can to prevent the spread of it, yet at the same time the germs are carried into our herds in such a way that they get it.

Q. Have you thought of any way to protect?

A. Our state has done nothing. I know of no way to surely prevent the spread of this disease. About the best we can do is to use disinfectants and keep everything very clean and sprinkle lime everywhere about the yards, sleeping places and troughs, and keep strangers from coming about the hogs unless assured they have been near no infected herds. We allow no hog buyers that travel the neighborhood buying hogs for the market to drive onto the farm when sickness is anywhere in the vicinity. I know that the germs can be carried, either by crows, dogs or chickens from one farm or lot to another. I know of instances where hogs were sick on one side of a woven wire fence and those on the other side never took the disease. But if one had stepped over the fence from the sick yard to the other, the others would have had the disease.

Q. Do you have window lights in your hog pens?

A. Yes, four lights, eight by twelve. The windows are hinged so they will swing in.

Q. Do you try to get milk for the pigs?

A. No, sir, we have no milk. The milk of human kindness is the best kind we have.

Q. How much tankage do you use?

A. We feed it with middlings and corn meal, about three-fourths or two-thirds meal and ten per cent. tankage; as the pigs get larger and become where you want to put some flesh on instead of growth, take off the middlings and make eighty per cent. corn meal and 20 per cent. tankage.

Q. What do you pay for tankage?

A. $30 for 58 per cent. protein tankage.

Q. Do you have sows eat their pigs?

A. Never. Feeding corn alone while she carries her litter is what causes it. Throw out all the corn the four months while she is carrying the litter, and by the time they are born she will eat anything.

Q. Do you feed them any salt?

A. Put salt in their feed.

Q. How about charcoal?

A. Feed once a week. Dissolve copperas in the water.

Q. What do you feed your brood sows?

A. Fed them this winter ground corn and oats equal parts, little tankage, alfalfa hay run through the cutter until it is fine.

Q. How many times do you feed a day?

A. Twice; never feed three times a day.

Q. Is there any danger of disease where you get the tankage from the slaughter house?

A. I don't think there is. It is so thoroughly prepared by the boiling process, and under pressure, and then under high temperature, three or four hundred degrees heat, and the skimming takes off a great deal of the impurities.

# WHAT WE BREED

## Pure Bred Stock Bred by Members of the Pennsylvania Live Stock Breeders' Association

### HORSES.

#### THOROUGHBREDS.

| Name. | Postoffice. | County. |
|---|---|---|
| R. S. Hartley | Youngsville | Warren |

#### STANDARD-BREDS.

| Name. | Postoffice. | County. |
|---|---|---|
| B. W. McKeehan | Mt. Rock | Cumberland |
| W. A. McCoy & Sons | Mercer | Mercer |
| H. C. & M. R. Elder | Darlington | Beaver |
| Henry Palmer | Avondale | Chester |
| Powell Bros. | Shadeland | Crawford |
| W. H. Ridge | Trevose | Bucks |
| John B. Kepple | Greensburg | Westmoreland |
| Ridge Farm (W.C.Norton) | Aldenville | Wayne |
| W. E. Stevenson | Burgettstown | Washington |
| Jas. H. Cowan | Duquesne | Allegheny |

#### TROTTING-BRED.

| Name. | Postoffice. | County. |
|---|---|---|
| J. M. Main & Sons | Shippensburg | Cumberl'd |

#### FRENCH COACH.

| Name. | Postoffice. | County. |
|---|---|---|
| Julius LeMoyne | Washington | Washington |
| Geo. Erk | Seelyville | Wayne |
| Powell Bros. | Shadeland | Crawford |

#### HACKNEYS.

| Name. | Postoffice. | County. |
|---|---|---|
| Powell Bros. | Shadeland | Crawford |

#### CLYDESDALES.

| Name. | Postoffice. | County. |
|---|---|---|
| H. C. & M. R. Elder | Darlington | Beaver |
| Powell Bros. | Shadeland | Crawford |

#### PERCHERONS.

| Name. | Postoffice. | County. |
|---|---|---|
| Nelson Poorbaugh | Mt. Pleasant | Westm'd |
| E. B. Boyle | Canonsburg | Washington |
| W. A. McCoy & Sons | Mercer | Mercer |
| Powell Bros. | Shadeland | Crawford |
| Geo. A. Hogg | Pittsburg | Allegheny |
| J. M. Main & Sons | Shippensburg | Cumberl'd |

#### ENGLISH SHIRES.

| Name. | Postoffice. | County. |
|---|---|---|
| Sam'l McCreary | Volant | Lawrence |
| Powell Bros. | Shadeland | Crawford |
| W. L. Christley | Slippery Rock | Butler |
| Geo. A. Hogg | Pittsburg | Allegheny |

#### MORGANS.

| Name. | Postoffice. | County. |
|---|---|---|
| M. B. Stephens | Dilltown | Indiana |
| A. R. Van Tassel | Dubois | Clearfield |

### CLEVELAND BAYS.

Powell Bros. ....Shadeland.........Crawford

### SHETLAND PONIES.

Wm. F. Gable....Altoona...............Blair
Powell Bros. ....Shadeland.........Crawford
W. M. Thompson..Uniontown........Fayette

## CATTLE.

### SHORTHORNS.

Name. Postoffice. County.
W. C. Black......Mercer..............Mercer
John Cummins ..Cummins............Greene
W. A. McCoy & Sons..Mercer........Mercer
R. L. Munce..Canonsburg.......Washington
W. J. Monroe ....Greensburg..Westmoreland
B. L. Post's Sons..Claysville.....Washington
Pa. State College..State College......Center
A. G. Shaffer..Rural Valley......Armstrong
T. M. Shively..Mifflinburg.............Union
Geo. G. Strosnider..Cummins.........Greene
W. M. Thompson..Uniontown........Fayette
J. R. Truxal..Greensburg......Westmoreland
A. S. Worden....Ulysses.............Potter
L. D. May....Granville Center......Bradford
L. Douthett ....Thornhill..........Allegheny
J. L. Stouffer...Southwest....Westmoreland
A. S. Eagleson..Washington....Washington
F. N. Hubbard.....Troy...........Bradford
C. A. Hershey...Gettysburg...........Adams
Lee R. Scott..Burgettstown...........Wash.
R. C. Vance..Burgettstown............Wash.

### POLLED DURHAMS.

Chas. Buchanan ..Utica.............Venango
J. C. Mattern & Sons..Hollidaysburg....Blair
D. C. Andrews..West Newton.Westmoreland
Lee R. Scott.....Burgettstown..........Wash.

### RED POLLS.

D. Norman App..Selin's Grove.......Snyder
B. E. Ferris......Hector..............Potter
N. O. Brownlee..Claysville......Washington
R. W. Crothers & Son.Taylorstown....Wash.
T. M. Shively...Mifflinburg............Union

### ABERDEEN-ANGUS.

W. H. Rink....Johnstown...........Cambria
Geo. Black........Plumville...........Indiana
Bayard Bros. ..Waynesburg..........Greene
James Blair ....Hartstown........Crawford
Pa. State College..State College.......Center
W. L. Christley..Slippery Rock........Butler

### DEVONS.

J. Cheston Morris..West Chester....Chester
Powell Bros. ....Shadeland.........Crawford
A. S. Worden....Ulysses.............Potter

### HOLSTEINS.

A. S. Worden......Ulysses...........Potter
W. T. Suter....Riverside...Northumberland
Sam'l McCreary ..Volant..........Lawrence
J. L. Henderson & Son..Washington..Wash.
H. M. Lyon & Son..Wyalusing......Bradford
J. M. Quivey....Houston........Washington
Powell Bros. ....Shadeland.........Crawford
W. E. Stevenson..Burgettstown......Wash.
W. M. Benninger..Benningers..Northampton
Jas. M. Paxton..Houston.........Washington

### JERSEYS.

R. S. Hartley....Youngsville.........Warren
Jas. I. Thompson.Lemont............Center
Chas. A. Porter.Torresdale......Philadelphia
Ludwig S. Filbert.Fox Chase....Philadelphia
C. M. Glasgow......Calvin.......Huntington
Geo. S. Barnhart..Greensburg.Westmoreland
E. B. Boyle...Canonsburg........Washington
Austin Leonard & Son..Troy........Bradford
R. I. Young....Middletown.........Dauphin
Geo. Erk ........Seelyville...........Wayne
H. C. & M. R. Elder.Darlington......Beaver
Wm. W. Harrison..Glenside....Philadelphia
W. F. Holtzer..Greensburg.....Westmoreland
J. F. Lantz & Co..Glenmoore........Chester
L. W. Lighty....East Berlin..........Adams
B. W. McKeehan..Mt. Rock.....Cumberland
A. L. Martin....Harrisburg.........Dauphin
S. E. Nivin.....Landenburg..........Chester
Perham Bros. ....Niagara.............Wayne

Powell Bros. ....Shadeland.........Crawford
Ridge Farm.....Aldenville...........Wayne
R. F. Shannon..Edgeworth Sta....Allegheny
W. F. Shrum...Adamsburg....Westmoreland
M. P. Shoemaker & Bro.,Greensburg.Westm'd
Edward Walter..West Chester......Chester
A. P. Warren.....Elizabeth........Allegheny
J. B. Wylie....Washington......Washington
John B. Kepple..Greensburg...Westmoreland
Jas. H. Cowan..Duquesne.........Allegheny
J. M. Main & Sons..Shippensburg..Cumberl'd

### GUERNSEYS.

J. N. Glover....Vicksburg.............Union
R. S. Hartley..Youngsville...........Warren
H. C. Bughman..Greensburg..Westmoreland
T. M. McKee....Lewistown...........Mifflin
H. W. Comfort..Fallsington...........Bucks
Wm. F. Gable....Altoona...............Blair
Henry Palmer ..Avondale............Chester
Pa. State College State College........Center
N. Poorbaugh..Mt. Pleasant....Westmoreland
W. H. Ridge......Trevose.............Bucks
J. E. Woodmansee..Lake Como.......Wayne
H. H. Snavely....Lancaster........Lancaster
I. F. McKee (R.D.No.5), Washington, Wash.
J. H. Peachey....Belleville............Mifflin

### AYRSHIRES.

Thos. Turnbull, Jr..Allegheny......Allegheny

### HEREFORDS.

J. I. Barley....Baker's Summit......Bedford

### POLLED ALBIONS.

B. E. Ferris........Hector.............Potter

### BROWN SWISS.

R. I. Young......Middletown.........Dauphin
W. H. H. Riddle..Butler.............Butler

## SWINE.

### POLAND-CHINAS.

Name. Postoffice. County.
J. C. Mattern & Sons..Hollidaysburg....Blair
C. A. Hershey..Gettysburg...........Adams
D. Norman App..Selinsgrove..........Snyder
J. I. Barley....Baker's Summit......Bedford
H. C. Bughman..Greensburg..Westmoreland
Burns & Adams..Imperial.........Allegheny
H. C. & M. R. Elder..Darlington......Beaver
Henry Palmer....Avondale...........Chester
B. L. Post's Sons..Claysville....Washington
T. M. Shively....Mifflinburg...........Union
A. G. Shaffer..Rural Valley........Armstrong
A. P. Warren...Elizabeth..........Allegheny
J. B. Wylie.....Washington......Washington
T. M. McKee......Lewistown..........Mifflin
J. L. Stouffer....Southwest....Westmoreland
J. H. Peachey....Belleville............Mifflin
Edward Walter..Westchester.........Chester

### TAMWORTHS.

R. S. Hartley..Youngsville...........Warren
Henry Palmer....Avondale...........Chester
Ridge Farm......Aldenville...........Wayne
M. P. Shoemaker & Bro., Greensburg, Westm'd

### CHESTER WHITES.

Austin Leonard & Son..Troy.......Bradford
J. A. Herr.......Mill Hall............Clinton
Henry H. Randt.Pipersville...........Bucks
G. S. Barnhart..Greensburg.........Westm'd
E. B. Boyle....Canonsburg......Washington
H. C. Bughman..Greensburg..Westmoreland
J. Grier Dain.....Malvern............Chester
Jos. T. Fleming..Belleville............Mifflin
Wm. F. Gable.....Altoona..............Blair
H. M. Lyon & Sons..Wyalusing......Bradford
J. F. Lantz & Co..Glenmoore.........Chester
W. A. McCoy & Sons..Mercer.........Mercer
B. W. McKeehan..Mt. Rock......Cumberland
J. C. Mattern & Sons..Hollidaysburg....Blair
W. J. Monroe...Greensburg....Westmoreland
R. L. Munce....Canonsburg......Washington
Edward Walter ..West Chester.......Chester

A. P. Warren....Elizabeth.........Allegheny
J. E. Woodmansee,.Lake Como.......Wayne
M. P. Shoemaker & Bro.,Greensburg,Westm'd
J. R. Truxal....Greensburg....Westmoreland
L. Douthett ....Thornhill..........Allegheny
John B. Kepple..Greensburg........West'md
A. T. Replogle....Waterside.........Bedford

### BERKSHIRES.

J. N. Glover....Vicksburg..............Union
H. C. Bughman.Greensburg...Westmoreland
Sam'l McCreary..Volant............Lawrence
George Black ....Plumville...........Indiana
W. C. Black ......Mercer............Mercer
J. L. Henderson & Son..Washington...Wash.
W. F. Holtzer..Greensburg..........Westm'd
L. W. Lighty.....East Berlin..........Adams
S. V. McDowell & Sons..Fredonia....Mercer
Pa. State College..State College......Center
N. Poorbaugh....Mt. Pleasant......Westm'd
Ridge Farm ....Aldenville............Wayne
W. H. Rink.....Johnstown..........Cambria
R. F. Shannon..Edgeworth Sta....Allegheny
Thos. Turnbull, Jr..Allegheny......Allegheny
A. S. Worden.....Ulysses..............Potter
N. O. Brownlee..Claysville......Washington
R. W. Crothers & Son.Taylorstown....Wash.
J. Cheston Morris..West Chester.....Chester
Geo. W. Mellotte...Lisbon...............Ohio
A. K. Miller......Mercer..............Mercer
A. S. Eagleson..Washington.....Washington
Edward Walter...Westchester........Chester
J. M. Main & Sons..Shippensburg..Cumberl'd

### DUROC-JERSEYS.

George Black....Plumville............Indiana
W. M. Benninger..Benningers....North'mt'n
B. L. Post's Sons..Claysville.....Washington
S. S. Blyholder....Neale..........Armstrong

### YORKSHIRES.

R. F. Shannon..Edgeworth Sta....Allegheny

### ESSEX.

H. C. & M. R. Elder..Darlington......Beaver

## SHEEP.

### DORSETS.

Name. Postoffice. County.
J. L. Henderson & Son..Washington..Wash.
Henry Palmer....Avondale.............Chester
J. B. Wylie....Washington......Washington
T. M. McKee....Lewistown...........Mifflin
A. S. Eagleson....Washington...Washington

### SHROPSHIRES.

J. C. Mattern & Sons.Hollidaysburg....Blair
C. M. Glasgow....Calvin........Huntingdon
C. A. Hershey..Gettysburg............Adams
Jos. T. Fleming.Belleville.............Mifflin
J. I. Barley....Baker's Summit......Bedford
W. C. Black......Mercer..............Mercer
H. C. & M. R. Elder.Darlington......Beaver
W. F. Gable......Altoona...............Blair
J. F. Lantz & Co..Glenmoore........Chester
S. Shaffer........Princeton.........Lawrence
B. L. Post's Sons..Claysville.....Washington
A. T. Replogle....Waterside.........Bedford
Edward Walter..Westchester.........Chester
D. S. Kloss..........Tyrone.............Blair

### LEICESTERS.

W. A. McCoy & Sons..Mercer.........Mercer

### LINCOLNS.

T. M. Shively..Mifflinburg.............Union
Edward Walter..West Chester.......Chester
B. W. McKeehan..Mt. Rock.....Cumberland

### SOUTHDOWNS.

Ludwig S. Filbert..Fox Chase...Philadelphia
J. Grier Dain....Malvern.............Chester
W. A. McCoy & Sons..Mercer..........Mercer
R. W. Crothers & Son..Taylorstown....Wash
W. M. Benninger..Benningers...Northampton
Edward Walter..Westchester.........Chester

### SPANISH MERINOS.

Jas. Lindsey & Sons..Utica..........Venango

### BLACKTOP SPANISH MERINOS.

John M. Berry....Wylandville...Washington
Wm. Berry......Washington.....Washington
R. P. Berry......Washington....Washington
R. L. Munce....Canonsburg......Washington
R. W. Crothers & Son..Taylorstown....Wash.

### DELAINE MERINOS.

E. B. Boyle....Canonsburg......Washington
Lee R. Scott....Burgettstown....Washington

### NATIONAL DELAINES.

J. B. Wylie......Washington....Washington
R. W. Crothers & Son.Taylorstown.....Wash

### OXFORDS.

A. G. Shaffer....Rural Valley.....Armstrong
A. S. Worden......Ulysses.............Potter

### HAMPSHIRES.

Jas. Blair........Hartstown.........Crawford
W. J. Monroe....Greensburg........Westm'd
Edward Walter..Westchester.........Chester

### COTSWOLDS.

S. V. McDowell & Sons..Fredonia.....Mercer

### ANGORA GOATS.

W. F. Gable........Altoona..............Blair

## POULTRY.

### PLYMOUTH ROCKS.

Name. Postoffice. County.
Austin Leonard & Son (B).Troy....Bradford
W. J. Monroe...Greensburg...Westmoreland
W. T. Suter (W).Riverside..Northumberland
J. A. Herr (B)...Mill Hall............Clinton
C. A. Hershey (B).Gettysburg.........Adams
J. H. Peachey......Belleville..........Mifflin
M. N. Clark (B)..Claridge....Westmoreland
Edward Walter..West Chester.......Chester
N. O. Brownlee (B)..Claysville.........Wash
H. C. Bughman (W)..Greensburg...Westm'd
Burns & Adams...Imperial.........Allegheny
J. Grier Dain (B)..Malvern..........Chester
H. C. & M. R. Elder (B)..Darlington..Beaver
J. Wolf Evans (Buff)..Spring Mills....Center
W. F. Gable (B &W).Altoona...........Blair
H. M. Lyon & Sons (B&W).Wyalusing.Bradf'd
J. F. Lantz & Co..Glenmoore.........Chester
L. W. Lighty (B) East Berlin..........Adams
W. A. McCoy & Sons (W).Mercer......Mercer
W. J. Monroe (B).Greensburg.......Westm'd
Pa. State College..State College......Center
N. Poorbaugh (B&W),Mt..Pleasant, Westm'd
Ridge Farm (W.)..Aldenville.........Wayne
R. F. Shannon (B) Edgeworth Sta..Allegheny
M. P. Shoemaker&Bro.(W) Greensb'g Westm
J. R. Truxal..Greensburg............Westm'd
A. P. Warren (B & Buff) Elizabeth, Allegheny
T. M. McKee (B)..Lewistown.........Mifflin
D. N. App (B&W), Selinsgrove.......Snyder
Jos. T. Fleming....Belleville..........Mifflin
J. L. Stouffer....Southwest..........Westm'd
J. H. Peachey (B)..Belleville..........Mifflin
A. T. Replogle (B.)..Waterside......Bedford
Jas. H. Cowan....Duquesne........Allegheny
A. S. Eagleson (B)..Washington.......Wash.
W. H. Gray (Buff)..Brookville......Jefferson

### LEGHORNS.

R. S. Harley.(Bf & R C B).Youngsv'le,Warren
B. L. Post's Sons (Br)..Claysville......Wash.
Jas. Lindsey & Sons (R C B).Utica..Venango
W. T. Suter (R C W).Riverside..Northumbld
Edward Walter.West Chester........Chester
G. S. Barnhart (Buff)..Greensburg..Westm'd
H. C. Bughman (Br.), Greensburg..Westm'd
H. C.&M.R.Elder (B&W), Darlington, Beaver
J. Wolf Evans (Scw W&B)Spring Mills, Cen'r
Wm. F. Gable (W.)..Altoona..........Blair
R. L. Munce (Br)..Canonsburg.........Wash
Pa. State College (Scw) State College.Center
R. F. Shannon (B&W) Edgeworth Sta...All'y
Geo. G. Strosnider (Br)..Cummins....Greene
M. P. Shoemaker & Bro. (Br), Gr'nsb'g,W'm'd
J. E. Woodmansee (Scw) Lake Como..Wayne
A. P. Warren (Buff), Elizabeth....Allegheny
N. Poorbaugh (Scw) Mt. Pleasant, Westm'd
J. B. Kepple (Br)..Greensburg......Westm'd
W. H Gray (Scw)..Brookville......Jefferson
A. S. Eagleson (Wh.)..Washington....Wash
J.M.Main&Sons (SCW).Shippensburg,Cumbld

### BANTAMS.

H. C. Bughman...Greensburg..Westmoreland
W. A. McCoy (WhG)..Mercer.........Mercer
R. F. Shannon (BBRGame), Edgeworth Sta.
..............................Allegheny

### BRAHMAS.

C. M. Glasgow (Lt)..Calvin......Huntingdon
Edward Walter..West Chester.......Chester
B. E. Ferris (Lt)..Hector............Potter
Wm. F. Gable (Lt)..Altoona...........Blair
Pa. State College (Lt)..State College..Center
R. F. Shannon (Dark) Edgeworth Sta..All'y

### COCHINS.

J. N. Glover (B).Vicksburg..........Union
W. F. Gable (Buff)..Altoona............Blair
J. M. Berry (W), Wylandville..........Wash
Pa. State College (Lt)..State College..Center
R. F. Shannon (Lt&Dk).Edgeworth Sta.All'y

### MINORCAS.

R. S. Hartley (R C Bl)..Youngsville, Warren
Wm. F. Gable....Altoona..............Blair
Pa. State College (Blk) State College..Center
Thos. Turnbull, Jr..Allegheny......Allegheny

### POLISH.

Pa. State College..State College.......Center

### RHODE ISLAND REDS.

R. F. Shannon.Edgeworth Sta.....Allegheny
Pa. State College..State College.......Center

### WHITE WONDERS.

T. M. Shively..Mifflinburg.............Union

### GAMES.

Pa. State College..State College......Center
R. F. Shannon..Edgeworth Sta.....Allegheny

### FAVEROLLES.

Pa. State College..State College......Center

### WYANDOTTES.

Jas. I. Thompson (W).Lemont........Center
T. E. Orr (All Varieties)..Beaver......Beaver
Pa. State College..State College.......Center
Bayard Bros. (Wh)...Waynesburg....Greene
Wm. F. Gable (Bf)..Altoona ...........Blair
Julius LeMoyne (Wh)..Washington....Wash
F. E. Traver (Buff)..Wyebrooke......Chester
R. W. Crothers & Son (W) Taylorstown,Wash
N. Poorbaugh (W)..Mt. Pleasant...Westm'd
Pa. State College..State College......Center
R. F. Shannon..Edgeworth Sta......Allegheny
B. L. Post's Sons..Claysville.....Washington
A. G. Shaffer (Sil.)..Rural Valley.Armstrong

### BUFF ORPINGTONS.

T. E. Orr........Beaver.............Beaver
W. A. McCoy & Sons..Mercer..........Mercer
R. F. Shannon..Edgeworth Sta....Allegheny

### TURKEYS.

Edward Walter.West Chester........Chester
H. C. & M. R. Elder (Br).Darlington..Beaver
T. M. Shively (WHol).Mifflinburg......Union
B. L. Post's Sons (MB) Claysville......Wash.
J. M. Berry (WHol) Wylandville......Wash.
W. A. McCoy & Sons (W Hol) Mercer..Mercer
A. G. Shaffer..Rural Valley.......Armstrong
J. R. Truxal....Greensburg.........Westm'd
R.W. Crothers&Son (WH) Taylorstown,Wash.
D. N. App (WHol)..Selinsgrove......Snyder
J. L. Stouffer (MB)....Southwest..Westm'd
W. H. Gray (MB) Brookville.......Jefferson

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J. F. Lantz & Co. (Pekin)..Glenmoore.Chester
W. H. Gray (Pekin)..Brookville....Jefferson

### GUINEAS.

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### GEESE.

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### PEAFOWLS.

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### BELGIAN HARES.

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Eagley Bros....North Springfield........Erie
W. J. Monroe..Greensburg..........Westm'd

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Name. Postoffice. County.
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T. Turnbull Jr. (Bull Terriers)..Allegheny.Al.

### COLLIES.

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T. E. Orr........Beaver...............Beaver
B. L. Post's Sons..Claysville.....Washington
Edward Walter ..West Chester......Chester
B. W. McKeehan..Mt. Rock.....Cumberland
H. M. Lyon & Sons..Wyalusing.....Bradford
T. M. McKee.....Lewistown...........Mifflin
W. H. Gray......Brookville.........Jefferson

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# MELROSE FARM

## GUERNSEYS

IN THE HERD ARE

**PONG No. 8398**
Sire Imp. Island Champion No. 6263, Dam Marguerite of Level Green No. 7966.

**MY LADY BALTIMORE No. 7829**
Sire Lord Baltimore No. 456, Dam Imp. Emeraude No. 1994.

**GOLD ELSIE OF HADDON No. 11263.**
Sire Violet's Duke No. 4222, Dam Glenwood Girl 7th No. 9114, and Advanced Register No. 9.

**BESSIE OF HADDON No. 14052**
Sire Donald of Pinehurst No. 5643, g-sire Mainstay No. 3789, Dam Lucretia of Haddon No. 10831, and Advanced Register No. 4.

**GRACE DEAN No. 12383**
Sire Millwood's Cousin Alfred No. 4879, Dam Mildred Jocelyn No. 6562.

**MAGGIE DICKSON No. 11036**
Sire Erwin of Cannonsburg, No. 4543, Dam Emma Hart No. 8710.

**SIS HOPKINS OF LINDON HOME No. 16775**
Sire Lily Ella's Jeweller No. 5417, Dam Lady Margaret 2d No. 10313.

**BELLE OF ROSENDALE No. 6949**
Sire Aeneas No. 5853, Dam Belle Brandon 3d No. 16745.

And others of the same breeding,
or of equal merit.

**H. C. BUGHMAN,**
OWNER,

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J. F. LANTZ. J. IRVIN LANTZ.

# J. F. LANTZ & CO.

**Shropshire Sheep,**
**Jersey Cattle,**
**Chester White Hogs,**
**Barred Plymouth Rocks.**

We are the originators, breeders and owners of "The Famous Flock of Waterside Shropshires" which was founded in 1888. Our stock is all recorded, and Waterside Shropshires can be traced through the records to the oldest and purest flocks in the world, and they are direct decendants of the most noted English prize winners.

Waterside flock is the oldest line bred flock of Wool-Mutton Shropshire sheep in Pennsylvania, and is one of the best wooled flocks in the world, as verified in the world's last and greatest contest, which the following letter will show.

BY AUTHORITY OF THE LOUISIANA PURCHASE EXPOSITION.

St. Louis, U. S. A., January 24th, 1905.
Messrs. J. F. Lantz & Co., Glenmoore, Pa.
Dear Sirs:—

It affords us much pleasure to notify you that the official Award List as handed us by the Superior Jury shows that you were given the High Distinction of Gold Medal in Group 95, Department of Agriculture, for wool. This is the highest award for Shropshire wool and you are accordingly warranted in making that fact public.

Respectfully,
The St. Louis Official Award Ribbon Committee.

The highest class best wooled imported rams that money can buy are always used for the further improvement of Waterside Flock.

When you want high class Shropshires, write to

**J. F. LANTZ & CO.,** Glenmoore, Pa.

**Jersey Home Stock Farm.**

BREEDERS OF
A. J. C. C. Jerseys
Brown Leghorn and
White Plymouth Rock
Chickens.

**M. P. SHOEMAKER & BRO.,**

Bell Phone 360, Ring 2. GREENSBURG, PA.

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REGISTERED JERSEYS.

St. Lambert, Tormentor, Golden Lad and Eminent 2nd blood all represented in our herd.

Let us quote you delivered price on
CHIPPEWA AGRICULTURAL LUMP LIME.

——WRITE NOW.——

M. E. REEDER,
R. F. D. No. 2. MUNCY, PENNA.

**Gombault's Caustic Balsam**

*The Worlds Greatest and Surest*
*Veterinary Remedy*
*HAS IMITATORS BUT NO COMPETITORS!*

SAFE, SPEEDY AND POSITIVE.

Supersedes All Cautery or Firing. Invaluable as a CURE for
FOUNDER,
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RINGBONE,
PINK EYE,
SWEENY,
BONY TUMORS,
LAMENESS FROM SPAVIN,
QUARTER CRACKS,
SCRATCHES,
POLL EVIL,
PARASITES.
REMOVES
BUNCHES or BLEMISHES,
SPLINTS,
CAPPED HOCK,
STRAINED TENDONS.

SAFE FOR ANYONE TO USE.

We guarantee that one tablespoonful of Caustic Balsam will produce more actual results than a whole bottle of any liniment or spavin mixture ever made Every bottle sold is warranted to give satisfaction Write for testimonials showing what the most prominent horsemen say of it. Price, $1.50 per bottle. Sold by druggists, or sent by express, charges paid, with full directions for its use.

*The Accepted Standard VETERINANY REMEDY*

*Always Reliable.*
*Sure in Results.*

*None genuine without the signature of*
The Lawrence, Williams Co.
*Sole Importers & Proprietors for the* U.S.& CANADAS. } CLEVELAND,O.

THE BEST FOR BLISTERING.
I have used GOMBAULT'S CAUSTIC BALSAM quite a good deal, and for a blister it's the best I ever used. I wish your remedy every success.
CHAS. MOTT, Manager.,
Mayfield Stud Farm, Leesburg, Va.

CURED CURB WITH TWO APPLICATIONS.
Have used your GOMBAULT'S CAUSTIC BALSAM to cure curb. I blistered it twice, and there is no sign of it any more. The horse is as good as ever.—DAN SCHWER, Evergreen, Ill.

*Sole Agents for the United States and Canada.*
**The Lawrence-Williams Co.**
*TORONTO, ONT.* *CLEVELAND, OHIO.*

*FOR HUMAN FLESH* As a liniment for any outward application there is nothing that equals Caustic Balsam, both for satisfactory results and absolutely safe for any one to use.
L. L. POPE, Secy, and Mgr.

# Breeders Remember This:

ORR'S FLY KILLER and
ORR'S LICE KILLER,

Each $1 per gallon, 5 gallon for $4. Have absolutely no equal.

Also Orr's Sheep Dip,
Orr's Dog Dip and
Orr's Milky Disinfectant,

Have no superior, 1 gallon of either diluted with water makes 100.
Price $1.50 per gallon, 5 gallons for $6.50.

For Sores, Cuts, Bruises, Scratches, Skin Irritations of any kind or for Abortion

Orr's Antiseptic Wash

is used constantly on the best of stock farms. Price $2 per gal., $8 for 5 gal.

This is the same Orr who is a member of this Association, and breeds All varieties of Wyandotte and Orpington Fowls. Also the finest of SCOTCH COLLIE DOGS.

T. E. ORR, - Beaver, Pa.

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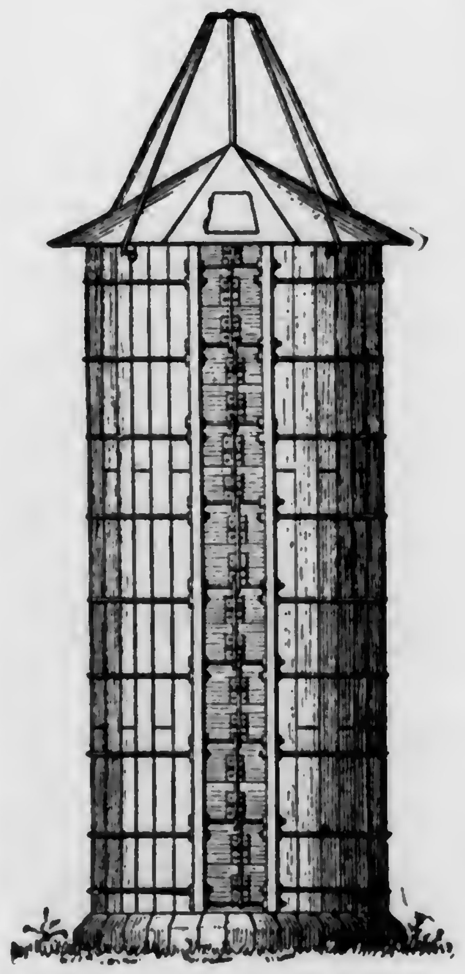

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**Water Tanks and Structures.**

Ask for Catalogue.

**E. F. SCHLICHTER**

1910 Market St., Philadelphia, Pa.

# THE "OHIO" MONARCH

Self Feed Ensilage Cutter with Blower Elevator

leads in the two points which are of greatest interest to dairymen, they being—

CAPACITY AND POWER.

They will cut and put into the silo more ensilage within a given time and with a given amount of power than any other Ensilage Cutters.

They are made in the following sizes, capacity, etc.

| Capacity per ton cut in ½ in. lengths. | Power. |
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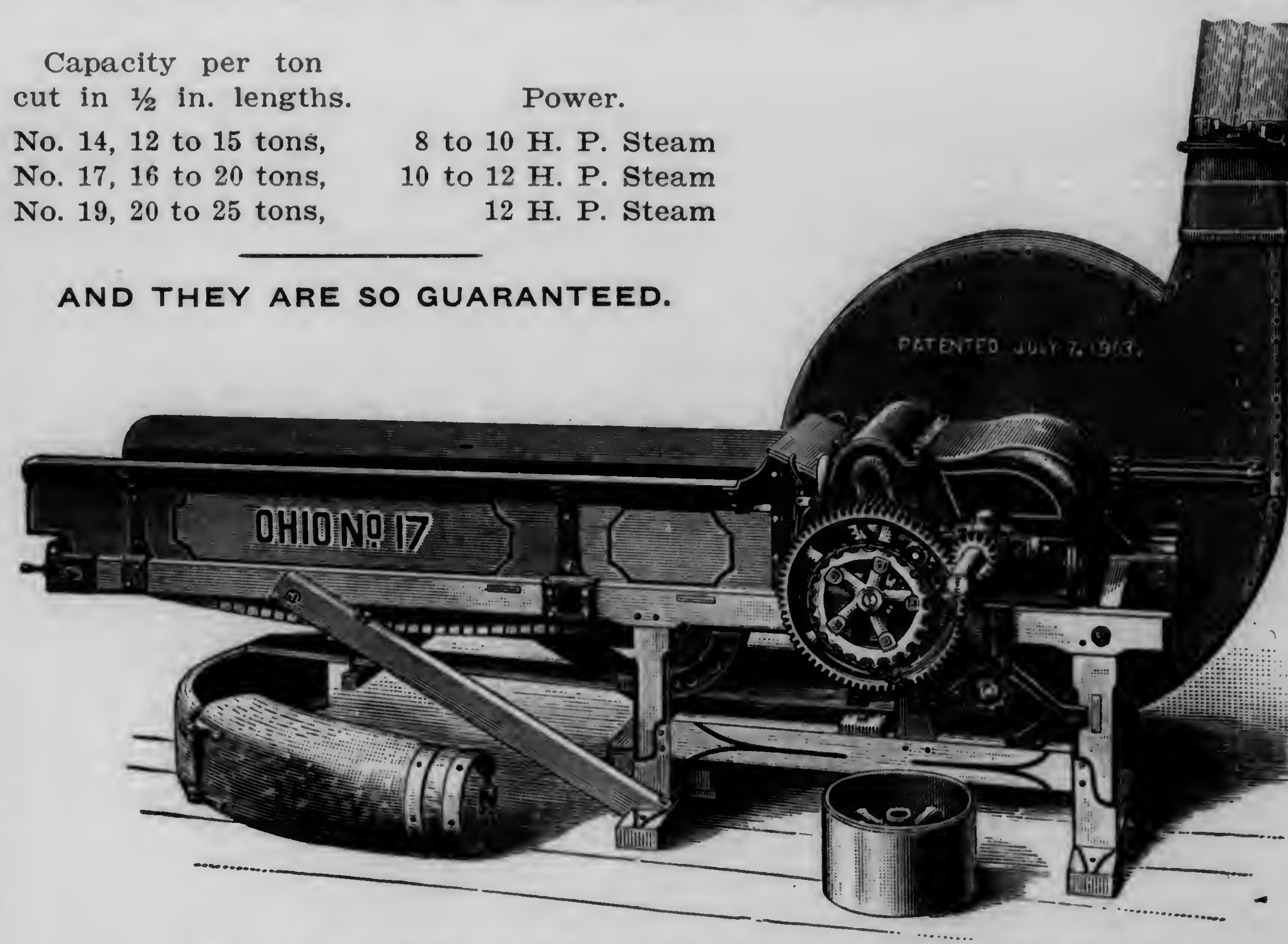
| No. 14, 12 to 15 tons, | 8 to 10 H. P. Steam |
| No. 17, 16 to 20 tons, | 10 to 12 H. P. Steam |
| No. 19, 20 to 25 tons, | 12 H. P. Steam |

AND THEY ARE SO GUARANTEED.



"Ohio" Ensilage Cutters were awarded a Gold Medal by the Louisiana Purchase Exposition St. Louis, Mo., 1904.

Silage is the cheapest succulent food for the dairy cow in winter and it produces more milk and keeps the animal in better condition than by any other means.

Experiment Stations have demonstrated that silage is the cheapest food known with which to carry beef cattle through the winter and it keeps them in excellent condition, then when they reach the right age finish them off with grain.

"Modern Silage Methods" tells all about planting, growing, cutting, curing and feeding silage and results. Price 10 cents.

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The Silver Mfg. Co., 315 Broadway, Salem, Ohio, U. S. A.

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THE S. P. LUMAS SUPPLY CO., 1917 Market St., Philadelphia, Pa.

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5 UNION STREET, 514 LIBERTY AVENUE,
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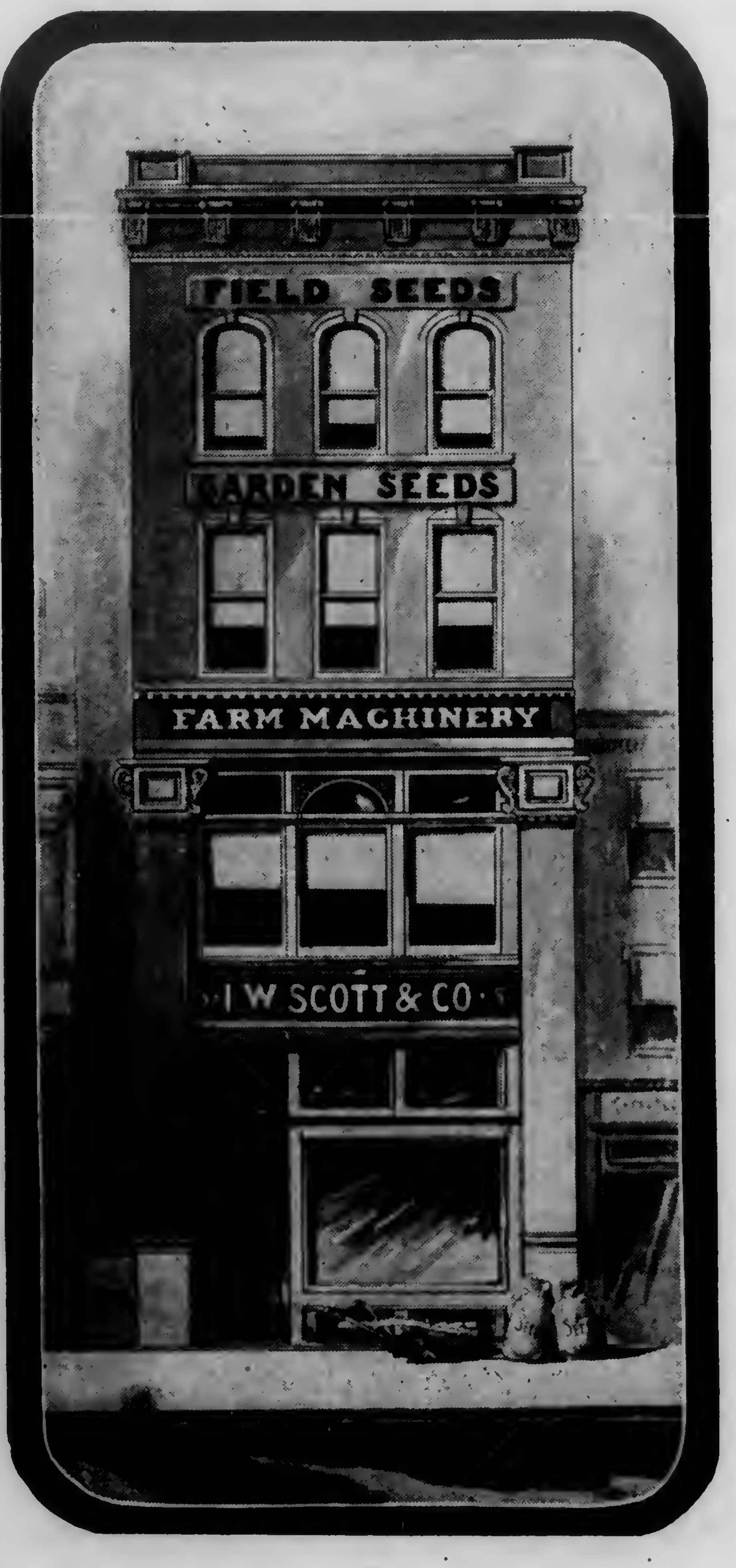
SEEDS AND FARM MACHINERY.



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Our stock comprises every kind of seed that is of any value on a Pennsylvania farm. Our aim is always to furnish pure seeds rather than to sell at low prices.

AGRICULTURAL IMPLEMENTS.

Our implements—from the Plow to the Threshing Outfit—are all of standard makes and Up-to-Date in improvements.

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We carry the largest variety of Standard Poultry Supplies to be found in Western Pennsylvania. Our trade in this department has more than doubled in the past two years.

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Our mail order trade is rapidly growing each year, and customers at a distance can depend on getting the same careful attention as the purchaser who comes to our store.

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Everything for the Farm, Garden and Poultry Yard.

END OF YEAR

Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1906

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1906

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BULLETIN NO. 12 OF

# THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

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PROCEEDINGS AND PAPERS OF THE

## SEVENTH ANNUAL MEETING

HELD AT

PITTSBURG, JANUARY 17 AND 18, 1906

F. D. BARNHART, President.
M. P. SHOEMAKER, Vice Pres.
D. B. FISHER, Treasurer

W. F. HOLTZER, Secretary
GREENSBURG, PA.
R. F. D. No. 1

STEAM AND TROLLEY CARS RUN TO
THE GROUNDS

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# THE Westmoreland Agricultural Society

Exhibition will be held in Fair Park, Youngwood, Pa.

**September 11, 12, 13 and 14, 1906**

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Jere Waugaman
J. R. Truxall
Jac. E. Wineman
D. B. Fisher
M. M. Byers
C. D. Eisaman
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**Premiums will be 25 per cent higher than last year.**

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# The Chester County Agricultural Association.

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| Vice President - | W. H. H. Davis, West Chester |
| Recording Sec. | Howard A. Groff, Esq. West Chester |
| Corresponding Sec. - | S. E. Howell, West Chester |
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Next Annual Fair will be held at West Chester, Sept. 11-12-13 and 14th, 1906. Liberal premiums paid on all classes of live stock and farm products. Prompt payments. Write for premium catalogue, now ready.

Come to the home of the Chester White hog, and see the best show of its kind in the World.

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# Jersey Home Stock Farm

BREEDERS OF

**A. J. C. C. JERSEYS**
**BROWN LEGHORN**
**AND**
**WHITE PLYMOUTH**
**ROCK CHICKENS**

## M. P. SHOEMAKER & BROS.

Bell Phone 360, Ring 2.

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**Selinsgrove**

Snyder County, Pa.

Breeder and Shipper of the Finest Strain of

*Red Polled Cattle*
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*Large White Holland Turkeys*
*White and Buff Plymouth Rocks*

SATISFACTION GUARANTEED

# Breeders of Aberdeen-Angus Cattle

Bayard Bros.
Waynesburg, Pa.

Choice individuals of fashionable breeding at fair prices.

Send for our circular on Angus Cattle and tell us what you want.

**BAYARD BROS.**

BELL PHONE **WAYNESBURG, GREENE CO., PA.**

# Blair's Herd of Registered Aberdeen-Angus Cattle

(ESTABLISHED 1884)

**LARGEST AND OLDEST HERD IN THE EAST**

JAMES BLAIR, PROPRIETOR

| SPECIALTIES | LOCATION |
|---|---|
| Breeding and Show Cattle<br>Registered Hampshire Sheep<br>American Carriage Horses<br>Correspondence and Inspection Invited | Farm is near Hartstown, on Bessemer & Lake Erie Rail-Way, Connection with B. & O., the Erie, the Lake Shore and Pennsylvania Railways. |

VISITORS MET AT TRAINS

Telephone at farm connects with depot, Wells-Fargo and Adams Express, Western Union Telegraph offices, Long Distance Phone. "Linesville No. 855."

HARTSTOWN, PA.

# Glen Gable Stock Farm

**Wyebrooke, Chester County, Pa.**

GUERNSEY CATTLE
and
SHROPSHIRE SHEEP

## Long Bridge Farm

**Calvin P. O.**

**Huntington Co., Pa.**

Phone on Calvin Line

REGISTERED SHROPSHIRE SHEEP
JERSEY CATTLE
LT. BRAHMA CHICKENS

**Stock for sale at all times and satisfaction guaranteed**

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**BREEDER OF**

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**AND**

**LARGE YORKSHIRE HOGS**

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## Glenfrew Farm

**Edgeworth Station Allegheny Co., Pa.**
**and 907 Liberty St., Pittsburg, Pa.**

**Jersey Cattle**

**Milk-Butter-Quality**

**Berkshire Hogs = good ones**

All registered stock

**Rhode Island Reds**

**Black Orpingtons**

**For Eggs and Meat = Prize winners too!**

**Airedale and Scotch Terriers**

The kind that are tractable—mind their own business and go for tramps and vermin.

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SHORTHORNS, BERKSHIRES,
PLYMOUTH ROCKS, BARRED
PURE BRED STOCK FOR SALE

## A. S. EAGLESON & SONS

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## Fairview Stock Farm

J. C. ANDREWS, Proprietor

Fairview Flock of Shropshires, have been bred to the famous Imported Ram and "Duke of Niagara", whose fleece those of his get won "Gold Medal" at World's Fair, St. Louis. Have also used "Duke of Niagara" 2nd and are now using Imported "White Plume" a Buttar Ram which sired 1st Prize Lambs N. Y. State Fair 1901.

WRITE FOR WHAT YOU WANT

| Fairview Flock of Shropshire Sheep | Andrews' Sure Death to Stomach Worms |
|---|---|
| Are strictly down to date in mutton and wool quality. They are direct descendants of the best bred English flocks. All Stock Registered. | The only Sure and Safe Cure for Stomach Worms in Sheep.<br>AGENTS WANTED |

Shipping Point, EVERETT, PA. MATTIE, BEDFORD CO., PA.

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## Battle of Brandywine

A second battle is being fought on the historic fields of the Brandywine battle of 1776. Not a strife between men and the roar of cannon, but along the same stream and over the same hills the Chester White is winning the fight and the great producer Keystone 9513 leads the herd holding the "hill" to victory, with Colonels Chester 11111 commanding the right wing, and Chester Medium 11367 supporting the left with a goodly number of matrons bringing up the rear.

Keystone is a well developed hog with fine hams, this feature showing strong in his get, heads the herd which won a good share of victory in the fights last fall in show ring.

When in need of a good Chester White, write

**F. W. LEVIS**
owner of Wingohocking Herd
**CHADDS FORD, PA. R. F. D. No. 1**

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**JERSEYS**
Combination and Golden Lad
FOR SALE— Cows, Heifers and Bulls.
**S. E. NIVIN,**
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**GUERNSEYS**
H. H. SNAVELY
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GUERNSEY CATTLE
BERKSHIRE HOGS
**Nelson Poorbaugh**
Mount Pleasant, Pa.

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D. S. KLOSS, of Tyrone, Pa., has a very high class flock of Registered Shropshires headed by a son of Imported Duke of Niagara. Write him and get a dip of this Blood into your flock.

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**FOR SALE**
The best CHESTER WHITE PIGS
WHEAT for sale
The best MAMMOTH BRONZE TURKEYS
***H. H. RANDT***
Pipersville, Pa.

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Breeder of Shorthorn Cattle, Shropshire Sheep, Poland-China Hogs and Barred Plymouth Rocks

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SHORT-HORN CATTLE

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SHETLAND PONIES

For sale

**W. M. Thompson**

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**Good Intent Farm**

*Arden, Pa.*

GUERNSEY CATTLE
The Best Blood

**D. F. MARONEY**

Proprietor

Farmers Bank Building
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GLENWOOD'S MAINSTAY,
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MARY MARSHALL
and other noted Families represented in this herd of GUERNSEYS.

1876 1906

LOCUST GROVE HERD OF

**IMPORTED AND HOME BRED BERKSHIRES**

Nearly 30 years of careful breeding, should and will suggest to aspiring breeders the wisdom of investigating the outstanding merits of this old established herd.

Several popular strains represented, i. e. LONGFELLOW, PREMIER, SUNRISE, HIGHCLERE, OXFORD, ETC.

SATISFACTION GUARANTEED.

**JAS. L. HENDERSON,**

155 Henderson Ave.,
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**JERSEYS**
RICHLY BRED

**2 Pure St. L. Bulls**
At head of herd

Our room is limited and farm is full.

**GENERALLY STOCK FOR SALE**

**Sixty Head to select from**

All inferior animals go to butcher
Write your wants Visitors are welcome

***W. F. SHRUM***

P. O. Adamsburg, Pa.
Penn Station P. R. R.

# PROCEEDINGS AND PAPERS
OF
# SEVENTH ANNUAL MEETING
OF
# THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION
AND THE
# PENNSYLVANIA DAIRY UNION

Heid at Pittsburg, January 17-18, 1906.

**Officers of Breeders' Association:**

President, - - - W. C. NORTON, Aldenville
First Vice-President, DR. LEONARD PEARSON, Philadelphia
Second Vice-President, M. P. SHOEMAKER, Greensburg
Secretary, - - E. S. BAYARD, East End, Pittsburg
Treasurer, - - - - - J. F. LANTZ, Glenmoore

**Officers of Dairy Union:**

President, - - H. E. VanNORMAN, State College, Pa.
Vice-President, - THOS. SHARPLESS, West Chester, Pa.
Secretary, - - - - W. E. PERHAM, Niagara, Pa.
Treasurer, - - - - M. E. Reeder, Muncy, Pa.

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PITTSBURG
SPAHR & RITSCHER, 6117-19 KIRKWOOD STREET
1906

# ANNUAL MEETING

OF THE

# Pennsylvania Dairy Union

HELD AT

MONONGAHELA HOUSE, PITTSBURG, PA.

January 17 and 18, 1906.

## PREFACE

The report of the proceedings of the annual meeting of the Pennsylvania Dairy Union and the Pennsylvania Live Stock Breeders' Association, held at Pittsburg January 17 and 18, 1906, is presented on the following pages. A slight abridgment has been found necessary in some cases, to bring the cost of publication within our means, but it is pretty nearly complete. Delays by stenographer, printers and the undersigned which were in all cases unavoidable have prevented as prompt publication as was hoped for. The work has to be done at odd moments so far as the editing is concerned, and it has been done under great difficulties. If there are any omissions or errors this is responsible.

We call special attention to our advertisers and urge readers of this Bulletin to patronize them. Our thanks are due to the Secretary of Agriculture, Hon. N. B. Critchfield, for his continued support and encouragement. At his request the Dairy Union and the Live Stock Breeders' Association will meet next year at Harrisburg the same week the meeting of the Pennsylvania State Board of Agriculture is held. See announcement elsewhere.

E. S. BAYARD,
Secretary.

Meeting of the Pennsylvania Dairy Union, held at Monongahela House, Pittsburg, Pa., January 17, 1906.

Meeting called to order at 10:00 o'clock A. M., by President H. P. Armsby.

President Armsby: We will now listen to the report of the Treasurer, M. E. Reeder.

Mr. Reeder: I will state that the receipts from all sources during the past year have been $263.70, and the expenditures up to January 15th, the date of the report, $261.07, leaving a balance of $2.63. The bills and vouchers are in my hands ready to be submitted to any proper authority.

It was moved and seconded that the reports be accepted and referred to an auditing committee of three. Motion carried.

President Armsby: We will now listen to the report of the Board of Directors.

Mr. Norton: In our meeting last winter the matter was left with the Board of Directors to make arrangements with the Breeders' Association to have a joint meeting, and we decided on Pittsburg. Also in the matter of the committee appointed to meet with other committees appointed by the Grange and other kindred organizations of the state to go to Washington and fight the Oleomargarine bill. We were never called together. The bill was dropped in Congress soon after the committee was appointed.

There are some matters we should bring up here. As to the next meeting place, and whether we will meet with the Breeders' Association or have a separate meeting. Our secretary and myself attended the meeting of the Dairy Union of New York State. We had the assurance of all of the machinery and supply people that they would exhibit at our next meeting if we would secure a hall. That we were unable to do here. The New York State Union was given $5,000 to run their dairy union, but at the present time they are paying all expenses out of the exhibits and the money that is put up by the cities where they meet. I think we should have an exhibit. We must if we make the dairy union a success; we must go on the same line as they do in other states and have butter and cheese exhibits and also dairy implement exhibits, and the New York people even had a milk exhibit. They had everything that was connected with the line of dairying ,and I would suggest this; and I also suggest before we leave here that consideration should be given to the matter of dairy inspection. They are doing good inspection work in Michigan and Wisconsin. As our Legislature meets next winter, this matter ought to be taken up next session. We need the help of every dairyman in the state and every creamery man, they are all interested. In our secretary's report, he will tell what he has done. We must have the help of everyone and secure legislation that will be to our interest as dairymen in this state. We are behind the other states. We are second in consumption of dairy products and certainly ought to demand that they be pure and good.

The President: You have heard the report of the Board of Directors embodying also certain suggestions for action which I take it will come up later, perhaps individually under the head of miscellaneous business. As the report itself is important, what action will you take upon the report of the Board of Directors? Shall it be accepted?

It was moved and seconded that the report of the Board of Directors be accepted. Motion carried.

The President: We will now listen to the report of the Secretary.

The Secretary: The Directors' report has covered the ground. I do not know it is necessary for me to say anything in regard to those matters other than the minutes which are covered by the proceedings which have been published and sent out. The committee on legislation has had no meeting since the last meeting of the Dairy Union, and there is nothing to report.

The President: Has the delegation representing the Dairy Union in the allied agricultural organization any report?

No report .

The President: We will now listen to a paper entitled "City Milk Production," by the Manager of the McJunkin-Straight Dairy Company, Mr. E. M. Bailey.

Mr. Bailey: My paper is a little bit off on city milk production. It is written on the city milk supply. As these two are so closely allied, it will not make much difference.

# CITY MILK SUPPLY

**E. M. Bailey, Pittsburg.**

There is no article of food which is so universally used from infancy to old age, and upon which so much dependence is placed by strong and weak alike, as pure milk. When we consider that it is the only food that will within itself sustain life for an indefinite period, and that in thousands of cases it is depended upon entirely to nurse the weak and suffering back to health and strength, we arrive at some idea of the importance of a pure milk supply for our cities.

Of late years a demand for a pure milk supply has developed among physicians, and those laymen who have given the matter the thought that it deserves, and, as is always the case where there is a well defined demand for an article, that demand is being satisfied to some extent along the lines of certified sanitary dairies and sanitary plants for the Paesteurization of milk.

## Sanitary Milk.

The producers of certified milk follow the idea that milk that comes from a healthy cow and is handled in a sanitary manner, cannot be improved upon, and that this is true no one can doubt. Briefly, the method followed by the above mentioned producers is as follows: First, the careful selection of a herd of cows, usually grades of the diferent milk producing breeds, that will at any time stand the most rigid examination by competent veterinarians. This herd is housed in a barn so constructed and arranged that the ventilation is as nearly perfect as it is possible to make it. The floors, stalls, and feed boxes are all arranged for daily scrubbing and kept immaculately clean —in fact, in one dairy that I have seen, when they have city guests out to inspect the dairy the table is laid for luncheon on the feeding floor between the two rows of cows. The walls and ceilings of these barns are either whitewashed every month or are so finished as to admit of scrubbing down frequently. In this way such a degree of cleanliness is secured as we like to see in the dining rooms and kitchens of our homes. The cows are usually stable fed all the year, being allowed out a short time in fair weather for exercise, and some of the herds are pastured to some extent during the summer. They are brushed and carded daily; their sides and udders are wiped off with a damp cloth just before milking. The milkers are required to dress in perfectly clean white suits, and to wash their hands in an antiseptic solution before milking each cow. The first milk from each teat is drawn into a separate pail and not mixed with the certified milk, in order that the colonies of germs that have grown in the end of the milk duct may not get into the milk sold as certified. The milk is drawn into closed sterilized pails through absorbent cotton, and transported to the dairy house some distance from the barn. There it is immediately cooled to at least 45 degrees and filled into sterilized bottles, which are then capped and sealed ready for delivery to the customers at from 12 to 16 cents per quart. Better milk than this there cannot be, and there is a demand in every city of any size for a large quantity of this milk, even at these prices. But the customers must be assured that they are getting what they are paying for, that is, absolutely pure, clean milk of a fair richness.

## Commercial Milk.

The great mass of city dwellers, however, cannot or will not pay such prices as this for milk, and yet they demand a milk that shall be pure and clean, of reasonably good quality, free from drugs or preservatives of any kind, and yet keep sweet from 24 to 36 hours after delivery. Fortunately for this class of people, Louis Pasteur, in his researches to help the wine makers of France, opened the way to what is now called the pasteurization of milk. This process, stripped of all technical terms, simply means the heating of milk to a temperature of from 158 to 160 degrees Fahrenheit, and the subsequent cooling down to 45 degrees or lower. This treatment destroys the germs which produce lactic acid, which sours the milk, and at the same time any pathogenic or disease producing germs which the milk may contain if the cow was not perfectly healthy, or if any external contamination may have taken place while the milk was handled from cow to consumer. Briefly, the milk for pasteurization must be produced from cows that to all physical appearance are healthy, kept in barns that are whitewashed at least once

a year, better twice, all floors and gutters kept clean and sweet, the cows brushed and carded as carefully as you do your horse, their sides and udders wiped off with a damp cloth just before milking. They must be fed on clean, sweet foods, but never just before milking on account of the dust stirred up and which carries millions of germs ready to drop into the milking pails. The milk should be drawn by milkers with clean hands and clothes, and as soon as milked carried into a milk room with a closed door between it and the stable proper. It should then be strained through at least 4 ply of cheese cloth, then cooled down by use of a Star or Champion type cooler to 60 degrees at the highest, better 50 if you have cold enough water, and finally put into clean cans and sent to the nearest shipping station with as little delay as possible.

## At the Shipping Station.

The shipping stations are usually maintained by the city dealer who buys this milk and as soon as the milk is received at the station it should be inspected by a competent judge for any foreign flavors, dirt, or anything else that might be detrimental to the production of fresh, sweet milk, and if found satisfactory, weighed in, run through the pasteurizing machines and filled into sterilized cans and shipped to the city, usually in refrigerator cars. Here the milk is again inspected by a man whose sense of smell has been trained by long use to detect the slightest taint that might in any way be detrimental to the purpose for which the milk is intended. After passing this inspection the milk is cooled down to a temperature of 35 or 40 degrees, and stored in large vats at a temperature near the freezing point. From these vats the milk is raised to the filter or clarifier which removes the last trace of any foreign substance which may have fallen into the milk while in course of transit. From these, the milk is taken to the pasteurizing machines where it for the second time goes through the process of pasteurization and from this it is filled into sterilized bottles, ready for delivery to the various customers in time for breakfast. It is absolutely necessary, through all these processes and handling, that cleanliness in all that work implies shall be observed, for in no place is the saying, "Eternal vigilance is the price of success," more true than it is in the milk business both in the producing and the handling.

Right here let me caution you against the use of common soap of any kind in washing your dairy utensils, owing to the fact that the odor of soap as well as the caustic it contains is well nigh impossible to get rid of, and anything with such an affinity for a stray odor as milk has, will be spoiled by the soapy odor very quickly.

The idea that pasteurization will make good milk out of bad milk seems to have some adherents, but this is a very great mistake; however, when used in connection with reasonable care in the producing and handling of milk, it furnishes a milk that compares favorably with the best handled certified milk at a cost to the consumer of half the cost of certified milk, that is, from 6 to 8 cents per quart.

## Old Methods of Handling Milk.

In contrast with the above methods let us see how the bulk of milk for the cities was formerly handled. In fact there are still great quantities of it being sold daily. Cows, any old thing that will give milk, no difference whether they give enough milk to pay for the feed they eat or not. Milked in a stable that is cleaned only when the dairyman can find nothing else to do. Cows never curried, manure sticking to their sides and flanks until they resemble the knight of old in his coat of mail. The milking is done any time and often the milkers use wooden pails, or worse still, tin pails that have felt the effect of Brindle's hoof so often they scarce look like pails. Milk dumped into cans not too clean without straining, or if strained at all only through a wire strainer, cooled by setting the cans in tank of water only because he knows the dealer will reject it if it is not fairly sweet when received in the city. In many cases this milk is dosed up with preservatives of some kind, though of late years this has gotten to be rather a dangerous proceeding, owing to the activity of our dairy and food departments enforcing the laws against adulteration. The milk is then taken to the train, shipped to the city to some dealer, who takes it to his sanitary (?) dairy in the basement of some dwelling or store or what may be worse, to the rear end of some store room, the balance of which serves as a living room for the family, here immersed in a tank of foul smelling ice water, allowed to stand until enough cream has risen to the top, then skimmed until it will barely pass the limit of fat required by the law, or if there is any assurance the inspector will not be in the neighborhood that day, the skimmer goes still deeper. It is then sold from a can, or churn as many call them, placed on the seat of the wagon beside the driver, measured in vessels that are coated with a film of dust from the city streets each time the wagon passes from one customer to the next. Or perhaps this milk is wholesaled to the corner grocer who stores it in his store along with onions, potatoes, cheese and various other flavor producing articles, to be sold to his customers at cost in order to draw trade.

Think of it, will you? This milk first flavored with the odor of a dirty stable, and a passing examination will disclose that it contains more than the odor, then with that of a dirty ice tank, than which nothing smells worse, then skimmed and doctored until a self-respecting cow would be ashamed to own it, then flavored with all the various flavors of a grocery store, and then this abortion of pure milk sold to draw trade; rather one would think it would drive it away. And yet there are hundreds and thousands of poor people who have never tasted the nice, sweet, clean flavor of pure milk, and who think this is all right. They don't realize that it would be better to use half the quantity of pure, wholesome milk ,that they would get more nutrition for their money. They don't realize it is feeding such stuff as this that causes such a large infant mortality, and if you, the producers of milk ,could see the poor little half-starved speciments of humanity that city dwellers see on the streets in the poorer sections of the city, you would register a vow right now that you would not only insist upon the production of clean, pure, wholesome milk, but you would see that the dealer handled your product in a cleanly, sanitary, honest manner or you would find one who did. Upon you to a certain extent lies the blame for the state of affairs which now exists, for these people do not know what pure milk is, you do, and just as long as this class of dealers can buy milk, these poor unknowing people are going to use it.

## The Remedy With Producers.

Now let us see what can be done to remedy this. First, you producers of milk for city consumption, try to impress on your minds the vital importance of what you are doing to some consumers of your product. Never handle a pail of milk without remembering that this milk may be the means through which health and strength may be regained by some sufferer if you handle their food as you know you should . Then know your dealer and know that he handles your product as he should do. Then hound your lawmakers until they will give the Dairy and Food Department money enough to inspect the sanitary end of the milk supply as well as the adulterations. While I do not for a minute believe that any chemical adulteration is necessary, but that it should be followed up as closely as it is being done, or closer if possible, and offenders punished, yet I do believe that more sickness and deaths are caused by milk handled in dirty cans in disease-ridden dairies and milk depots and in filth generally, ten times over, than were ever caused by chemical preservatives used in milk. An investigation of recorded epidemics of typhoid fever alone that have been traced to the milk supply will convince anyone of the crying need for action in this direction.

This being the case, why is it not time something was done in this direction? More frequent examinations of the milk supply of our cities and villages are necessary. Examinations bacteriologically, microscopically and chemically of the milk sold by every distributor should be made monthly. If these examinations show the milk from certain distributors is not being handled properly, a thorough inspection of the city plant or depot of this dealer will determine if he is at fault or not. If he is at fault, proceed as is deemed best by the Department to make this dealer remedy his methods, or if his methods are found right then examine the milk from the different sources from which he secures his supply in the same way and when the trouble is located notify the dealer and hold him responsible, as it is within his power to either have the trouble remedied, or to refuse to buy the milk from the producer who is at fault. This followed up conscientiously, and it can be done without the expense being burdensome, all milk required to be pasteurized and all deliveries made in glass bottles that have been thoroughly cleansed and sterilized before filling, and the day of epidemics caused by an impure milk supply will be a thing of the past.

## Discussion.

Dr. Barclay: The first time that I prepared a paper on the subject of milk, its production and uses, and read it, I was very much discouraged by many of my friends on account of the subject being a new one. I read that paper at Louisville, Kentucky, before the Mississippi Valley Association about twelve or fourteen years ago. In that paper I made some statements which were pretty broad and still somewhat startling. One of the statements was that over 40 per cent of all dairy cattle in and about the city of Pittsburg were tuberculous, and afterwards many persons who seemed to know something about it thought I had very much overdrawn the percentage of tuberculous cattle, but after investigation it was found that I had not quite told the whole truth. It seems to me with all the efforts that have been put forth, and with all that has been said and done by honest dairymen, at least in the city of Pittsburg, we are further away from pure milk than we have ever been. I believe that the milk that is sold in Pittsburg to-day is further from the standard than it has ever been before. We have a large number of places in Pittsburg that I have denominated milk factories. Now, I suspect that perhaps there is very little, if any, milk sold from those which is fit to be used. It would require more time than I feel like occupying in giving the reasons for that conclusion, but I am certain if that milk is tested that it will be found to be about what I denominate "commercial milk," that is, just to evade the law, and the greater part of it I believe would not pass the requirements of the law. Two years ago while in New York and Newark, N. J., I had an opportunity to study the subject of milk. The milk that is produced in New York is very good, very much better than it is in Pittsburg. Another place, not a city, although it is sometimes called a city, I visited some years ago and at once took up the study of milk there and the milk in that place, Asheville, N. C., was the best that I have ever found anywhere. The milk produced on the Vanderbilt farm was over and above anything I have ever found. I suspect the milk in New York is better than that supplied to the consumer anywhere in the United States except in Ashville. The milk in Chicago is very good. And now, gentlemen, in my judgment, there is only one way to bring that matter to what it should be ,that is by efficient laws, and their enforcement. I do not believe that any amount of talk or any amount of moralizing that we can do will ever bring the production of milk to what it should be. It seems to me that there is such a large temptation to be dishonest. Now ,not very long ago, I was lauding a friend who has a small dairy up in Indiana county. I said I believed that he was an honest man. I was thinking of him and recommended the products of his dairy to a man who wished to buy milk. He said, "That is true. I want to tell you I bought several cans of cream from him. I appreciate all you say, but you have never studied that man carefully. Last summer in the hot season I received from him a number of cans of cream, and it keeps well. Why, I kept that for two weeks. It was perfectly sweet, and when I tried to churn it, it ran all over the place. I dipped out until finally I gave it up, there was no butter in it. If there was, I was not able to get it." Now that man is an elder in the Presbyterian church, and I had the impression that he was a perfectly honest, honorable man, and that was a backset, but that is only one of a very large number. It is a difficult thing to find a man who will not be tricky and play you false in the production of milk. Now, I am sorry to say that, but it is true, I know what I am talking about and if anybody objects I can give the facts.

Now, the laws of this state are as nothing; we all know that we have had a number of laws, but the laws that we have had have not been enforced. The pure food laws of course are being enforced, but it is a very easy matter to pay the fine and go on and poison people. I heard the gentleman referring to sterilizing of all vessels, and that point is well taken. As far as I know, the only means for the preservation of milk beyond the time it will naturally keep before it sours is cold. Now, then, the scientific application of cold to milk after it is drawn to relieve it of the animal heat and then keep it at a proper temperature is the only proper means for the preservation of milk in order to produce it fit to be used by the human being.

## Dairy Inspection.

Mr. Wells: I would like to say a word to emphasize the points brought out in the papers, of the necessity of dairy inspection. By dairy inspection, I mean inspection of the animals, the cows that produce the milk, and the premises, the stables, and surroundings and also the methods of handling the milk. I am satisfied that we will never arrive at any great degree of perfection until some means or some laws are passed to effect this, personal inspection by a person who is authorized to look to this matter. Pasteurization does a great deal, but I look upon that simply as I do upon the water supply. If we can get water that is pure from the fount of Heaven, it is much preferable to putrid water that has been filtered and made fit for use. I do not think we realize, many of us, the conditions that prevail. It was brought to my attention very forcibly not very far from this city. There was a contract made to supply butter for the United States navy, and it was in part under the supervision of the Department of Agriculture, and I was sent to the district to see what the facilities were for producing this butter and the fulfillment of the contract, which had been already been made. I spent a half a day, with a team and a man driving around and looking at and visiting as many of the various dairies as I could find. It was, I think, some time in April. I did not find a dairy barn that any gentleman in this house would say was fit to keep cows in. In that inspection I did not find one that had a window in it or any proper means of ventilation. The third barn I visited was a large building, one side was arranged for stalls for the cows, occupying two-thirds of the space, and the other third was a pig pen filled with hogs. In talking with the creamery man about it, he said they were in the habit of leaving a night's milk setting on the barn floor where it got the fumes of this hog pen. About noon we reached the Secretary's premises. I thought to myself, "Here we will find a barn as it should be." We took dinner there and while the teams were being unhitched, I took the opportunity to go down into the stable. It was noon, and a bright day, and when I got in it, I could not see ten feet from me. I suppose there was one door about wide enough to let a cow in, but no window. It seemed surprising that such conditions prevail, but I know from personal experience they exist in certain localities. We are doing good work in many states in this line by personal inspection. Even if there are no very severe penalties for unsanitary conditions, yet the fact that they are to be inspected from time to time and the reports go to the state has of itself a very beneficial effect.

Prof. Lane: We cannot say too much of cleaning up. It has been my hope the milk producer would have an opportunity to exhibit his production just as well as butter and cheese producers. You know such contests have never come about as far as I know. You have heard the Great National Dairy Show that is to take place in Chicago next month and here there seems to be an opportunity to bring this about, to have a test for the milk and cream producers as well as butter and cheese producers. It has been the custom for a number of years for dairymen's associations to offer prizes for the butter scoring the highest number of points, or cheese, but it seems to me there is all the more reason why the milk producer should have an opportunity to show his products and should enter in a contest for prizes or medals.

Mr. Wilson: I will ask the doctor if he would recommend pasteurization of good, sanitary raw milk.

Dr. Barclay: No, sir. I think it is a mistake. I believe that it never should be done. I think it has so changed the physical condition of the milk that new products are formed there which are very injurious.

Mr. Reichert: One of the questions that confronts the average farmer who is trying to run this business is, "How can I get recognition for my milk for the efforts I display?" We put forth efforts to do our work conscientiously and sell the milk so that it would be within the reach of the average person. That is selling at six or eight cents a quart. Any man knows that any one who is producing a pure, sweet milk and a clean wholesome article, and sells it for six or eight cents, has a pretty good job. There are hundreds of dairymen in Pennsylvania who are conscientious in their efforts, who cannot get recognition simply because there is no law, there is no anything, to help us get the recognition we ought to get for an honest article. The dairymen here are going to do something in the shape of asking the legislature to give us some kind of a law that will enable those of us who are not prepared to spend thousands of dollars in advertising to have our article recorded and recognized simply for what it is, and I believe before we pass the resolution during the day asking for a law there ought to be some kind of discussion as to what we ask for. It would be a good thing to have Governor Hoard tell us what they are doing in Wisconsin. To me it looks as though a compulsory inspection law in itself would be violated and inadequate. But I believe that if I, as an ordinary dairyman, would know that the state inspector is going to inspect my dairy once a month, is going to test my milk, and give me a certificate that would be recognized by all people throughout the state, which would tell the conditions, and I did not know the time that inspector was coming, that such a persuasive law as that would do a great deal more good than a compulsory law. I offer that as a suggestion for you dairymen to think about.

Dr. Barclay: I would like to ask the gentleman if he believes conscience prevails in the production of milk.

Mr. Reichert: Well, I am an optimist. I have rubbed up against men for a long time, and while I know that some of us have pretty raw edges, yet it has been my faith, after rubbing up against the world for a good many years, that the great majority of men to-day mean to do right if there is half a chance, and I want to tell you that the world is to blame in the majority of cases if a man goes wrong, for the reason that they pooh-pooh the right, that they put just as good a brand on dishonesty as they do on honesty, thus making it really an incentive for a man to be a little crooked rather than an inducement to do right. For instance, a conscientious dairyman who tries to give you five per cent milk, curries the cows every day and tries to have everything clean, makes all sorts of sacrifices, doesn't get a bit more encouragement than the fellow that has his cows covered with dung from their heels to their ears, that never washes himself, let alone his cans, and that gets in close proximity to the pump once in a while. The fellow that is taking in half water and half milk and half cow dung and half something else, gets just the same credit. I think it is the public that is crooked rather than the dairyman. (Applause.) Gentlemen, I believe that the hearts of the people are in the right place if they are given half a show or the least encouragement to do right. The dairymen along with the rest of the world will stand ready to do their part. (Applause.)

It was moved and seconded that the subject of dairy inspection be made a special order of business for the afternoon after the election of officers.

Motion duly seconded and carried.

President Armsby appointed Mr. J. H. Reichert, Mr. M. P. Shoemaker, and Mr. J. F. Lantz as an auditing committee. It was moved and seconded that the committee on resolutions be appointed to which all resolutions shall be referred for consideration and recommendation back to this meeting. Carried. Messrs. Shoemaker, Henry Palmer and E. M. Bailey were appointed as such committee .

President Armsby thereupon called Mr. Norton to the chair.

Mr. Norton: We will now listen to a paper entitled "What Dairymen Are Doing," by H. E. Van Norman, Professor of Dairying at Pennsylvania State College.

## ADDRESS OF PROFESSOR H. E. VAN NORMAN

Gentlemen of the Pennsylvania Dairy Union: In coming to this state to take up this work, it was not because there was nothing to do where I have been, but because I believed there was something even larger to do here, and possibly greater facilities with which to do them, and that in the doing I might have a part. I want to call attention to some of the things as they are; then to make some suggestions as to how they may be changed if you want them different.

In the first place I find that Pennsylvania ranks second as a dairy state in the union in the value of her products, in the volume of her products both in butter and cheese; but she ranks fifth in the number of cows it takes to produce these products—a suggestion that you are getting better results from the cows you are keeping than some other states. I find that the average production of the cows of this state is only 150 pounds of butter per cow. I do not know yet what it costs to keep a cow in this state, but I imagine that it could not be very far from what it is in some of our other states. Therefore the statement of somewhere from $28 to $40 would take care of the average cow of this state. When we talk about average, you gentlemen do not represent the average dairymen of this state. You represent the cream of the dairymen, the men who know so well the difficulties of your work and that there is something to be learned that you are willing to lay down your tools and come and try to find out from your neighbors the better way. The average dairyman has not reached that state of development. How many of you are willing to admit you are only getting 150 pounds of butter per cow per year?

In my work I have to keep in mind not the creamery alone, but the great mass of the dairymen, and what can we do to help them as well as to help you. The average cow of this state, as I said, produces about 150 pounds of butter. At twenty cents a pound, it just about pays for the feeding. Yet investigations carried on in many states of the union (I have no figures to quote from this state yet) show that it is possible for every dollar's worth of feed to get from the cow from a dollar and half to two dollars worth of milk and buttter. Then if we are feeding our cows $40 worth of feed, we ought to get somewhere from $60 to $80 return, charging her for that feed at the price that the feed is worth at the time. Then I say if you can sell to the cow the feed at market price and get a return of from fifty cents to a dollar over and above the cost it is good business. Now, if you can produce the major portion of that feed and also have a profit, whatever profit there is in the production, then you have the two profits of the producer and the feeder. Perhaps some of you are located where you have to buy a great deal of feed; others possibly are located where you can grow a great deal of it. Each one must take those things into account and work them out to suit. The fact remains there are a lot of men keeping cows that do not pay. In order to bring this average down as low as 150 pounds there must be a lot who are keeping cows which do not produce that much, and when you come to a careful investigation of fifty or a hundred herds you will find men that are not getting eighty cents for the dollar's worth of feed; and as one man was asked how did he make his farm pay, what did he do to get the other 20 cents, said, "Well, we have to have something to eat up the feed." You see his aim was wrong. He was trying to get his feed eaten up instead of trying to get a profit. Most of us look at these things from a dollar and cents standpoint, not merely for the standpoint, but because we have to have money in our business, and in the discussion of these things I hope to keep in mind all the time the natural phase of the thing, because if we cannot make the thing add to our income either directly or indirectly, most of us cannot spend much time on it. Indeed it is only here and there a man is willing to put the quality of his product above everything else, whether it costs money or makes profit. Most of us have to have a little profit.

### How to Advertise.

We oftentimes lose sight of the fact that superior quality in itself makes for a profit by increasing a demand for a good thing. It was suggested by the question that was asked, that many of us are not sufficiently good business men, good advertisers, to get our good products before the people that want it. I am firmly convinced that in every town of from 12,000 to 30,000 people, there

are more people who want a good article and who are willing to pay for a good article than the dairyman with 150 to 200 cows can supply, but it is not every man who can produce a good product that is a good enough advertiser to "get there." There may not be a bit of merit in some things that are advertised, but the advertising has made everybody know about them, and the selling of a thing is oftentimes in the advertising first and the quality second. We have got to get our good article before the people. You or I cannot perhaps get a new law right off, but we can go at advertising to-day. The question of making people know more about the quality of the thing we have got is before us. I leave that as one suggestion. I speak with a knowledge of the facts that men are doing it, that men are selling milk, good milk from clean cows kept in a clean way, at a price above the market because they have succeeded in making the public know that they got that, and then, as our optimistic friend said, they have that honesty and integrity which in itself is a guarantee that if the milk is this way to-day it will be so to-morrow. That is the first thing. The next thing is to make the public know you have got it.

We find a great many people who do not know that the whole success of keeping milk is keeping it clean, first keeping the dirt out, because along with the dirt is the cause of decomposition, and the next point is keeping it cold. That is the whole secret of milk. Pasteurization helps if you have not got both of these conditions. If you have both of these conditions, added to healthy cows, you have no need of pasteurization, for milk ordinarily should be consumed within two or three days. Good milk will keep that long if it is kept clean enough and cold enough, and "enough" is within the reach of commercial conditions. Dairymen are doing those things. Milk was sent to Paris during the exposition there that was sweet 18 to 21 days because it was sweet and clean and cold. We have had milk on our table at home seven days old which was perfectly sweet as far as any mortal could tell it. Of course there may have been some little change going on, but for all practical purposes that milk was sweet seven days old. It was from clean cows and a clean place and kept cold, by a man who was in the business, as he said, for fun, but he said the fun was all gone when the balance was on the other side of the ledger. He was not spending a fortune, he was trying to make something and to teach his boys to furnish milk of that kind, as the business had grown from two cows ten years ago to 200 cows last year. Why? Because the fact that this milk came from there was a guarantee that it was all right. I say dairymen are doing these things, they are furnishing this kind of milk here and there and they are not producing it at a loss, but now what we need is to show the great mass of dairymen some of those things, some of these methods, that are successful in making good milk and in making profitable milk, and how are we doing it? We are doing it by such associations as this. We are doing it in a number of other states in another line. I want to put the question to you, How far do you want to go in that line?

### Instruction and Inspection.

In Illinois they are having five men connected with their station and stationed there and a considerable part of their time during the year is spent in lines of work that tend to bring these facts home to the producers of the state. For instance this question of the cow. They have one man who goes from farm to farm in a certain section within the limit of his time and ability and teaches those people how to study the question of economic production, how to sample their milk, how to weigh their milk, shows them a plan that is so simple and easy that they can do it, and we find as a result of that work that once a man's attention is called to it and he learns how easy and helpful it is, he keeps it up. Wisconsin has a number of men who are doing the same thing. Indiana has recently started in that same line, and we had, when I left there, something like a hundred cows just near the college that were under test, tests that were started and suggested by the college, and helped out in a way with funds which the dairy interests of the state have provided. Now, the point I want to make in connection with these suggestions is that we at the College, I am prepared to do all that I can to help you in your work in any line that we do the things you want done and provide the wherewithal to do it. Now, in taking charge of the dairy department there at the College, I am prepared to do all that I can to help you in your work in any line that our department can so far as you are ready to have that help and provide the means to give it. Whether it shall be in teaching the boys that you send there how to make butter, how to handle milk, how to inspect milk, how to make cheese—whether it shall be in carrying on tests, investigations or demonstrations and experiments, or field instruction among the creameries. In Indiana we have one man who gives his whole time in travelling from one creamery to another, spending a day or two there helping the butter maker to overcome the difficulties that he finds there. What is the justification for that? In three times inside of two weeks was he able, by a couple of hours' work in the creamery, to save that creamery man from one to three dollars a day. Who gets the benefit of that? It comes back to the patrons of the creamery, because it has reduced the expense of making that butter or cheese as the case may be. In this case it was butter. Now, dairymen are doing those things in other states, what do you dairymen want to do in this state? I am ready to help to work out the problems just as fast as the advantages will permit. Minnesota made a good showing at the World's Fair, because of the work she had done among her people. Wisconsin has done her work along the cheese line. Indiana and Illinois are doing their work among the manufacturers. Canada has over 30 men working along these lines. So much for what some of the conditions are, and what some of the things are that the dairymen are doing to support and help and overcome them. Dairymen of other states are carrying on, in connection with a meeting of this kind, a dairy exhibition. Why can't we in Pennsylvania have a big dairy meeting-show in which we shall have butter and cheese and possibly milk, for this is a great milk producing state for the retail market. Why can't we have a dairy machinery show in connection with it where the creamery men, the butter makers and farmers can come together and see the latest machinery? Those things are being done in other lines. One suggestion comes to the breeder as to what the dairymen are doing. I picked up a report the other day and in the back I saw an ad like this: "We keep our cows for profit. Our cows averaged seventy-four dollars over and above the cost of feed for the last year. We have two bulls for sale from cows of this kind." I just thought, there is a breeder that is going so far ahead of the average that he ought to be advertised from one end of the country to the other. Now, when our breeders of dairy bred cattle will quit glueing their eyes to pedigrees entirely, and look to the production of this kind, and show the average dairyman a bull from a cow of that kind it will sell. I believe it is good business for you folks to think of that thing.

## Milk Inspection.

I want to say a word in closing about this matter of milk inspection. I haven't the thing worked out to where I have a cut and dried plan that I am ready to lay before you. But I will say that this work and these things have been impressed on my mind by my observation so far. Therefore, if the state or the government, or whoever inspects that product, is going to determine the quality of the milk used in Pittsburg to-day they have got to inspect everybody's milk that comes in. It is not easy. It is impossible, it is impracticable, it is financially impossible to do that thing, at least in the near future. The quality of the milk is determined very largely by the conditions under which it is handled. Now I believe that our inspection should be directed more to the changing of conditions under which the milk is produced than to an examination of the milk after it is produced, because milk that is produced in clean places from healthy cows and handled in clean vessels is pretty apt to be wholesome and healthy. Then a very little inspection to guard against skimming and so forth will do the work . In order to do that our inspectors have got to be not medical students who are trying to work themselves through college, to medical school, and because of some good friend in connection with the board of health, or city alderman, get the appointment as milk inspector, but be some practical farm men who know when a stable is commercially clean. There is a cleanness that is theoretically clean, and can only be obtained in the laboratory. There is a cleanness that is dollars and cents possible. The cows can be made clean enough so they don't have to be curried, they don't have to have manure all over their flanks. The barn must be made light. The inspector comes in and sees the barn is not ventilated, and he tells them you cannot sell milk until you fix those things up. When our inspection takes that phase the great mass of milk that comes into our city will be better. We have got to have an inspector who not only knows what is proper, but has sufficient integrity, strength of character and good business judgment. One city inspector in a western city, if you paid something, your place passed inspection. We can't get rid of that entirely. I am like my friend, I believe most of us are honest all right, I believe that it is possible to get this class of inspectors when we go after them. Then inspecting these conditions means our seeing the milk shall be clean. If the man who produces and handles the milk has not a clean stable, you can't have clean milk. He has no facilities for getting hot water and cleaning the tins, scalding the tins in which his milk is handled. You may as well shoot at a stone wall as talk to him about cleanliness. You cannot get rid of the germs that come from lack of cleanliness under those conditions. I believe we have got to direct our inspection then at these conditions, and control them, and I think that the tendency is that way.

Now, one other point. The public, that great undefinable, ungetatable somebody that dictates what will or won't be, I believe we have got to put a part of our time in educating the public as to what good milk is. It is one of the purposes I had in mind, a scheme somehow or some way to show our public the difference between good and bad milk. I am open to suggestions or anything that will help educate the public, because the public is just like Pennsylvanians. Now, when we show the public that there is a real difference in milk, then they can understand. The average housewife talks about bacteria and things of that kind—it is something she listens to, but doesn't know what it means. A part of our effort must be directed to educating the public as to what clean milk is and what cold milk is, and the result in quality of having those few things.

## A Little Experience.

I started out to sell cream in a little town where our college was situated. Our cream sold for ten cents a pint. I said to the best grocer in town, "I will sell you 40 per cent cream at 20 cents a pint." "Man," he says, "folks won't pay that price. They only pay 10 cents." "Yes," I said, "I know that. Are they satisfied?" He said no. I said I would send him over four pints. It was put up in paper packages so it did not have to be returned. I said, "You give that to four of the best customers. It is an experiment. Then you report." He started in. He took about five or six pints a week, and in a few months he took 40 to 50 at twice the price. Why? Because, in the first place, the quality was there, and in the next place I took pains to educate that grocer, and I told him that the whole secret of milk was keeping it clean and cold, and to tell his patrons how to keep it cold, tell them not to pour it in some dish that had been wiped with a towel. Here is a little thing—there are over three thousand times as many bacteria on that utensil which you have wiped with a clean towel after scalding it, as there were if you had simply scalded it and left it hot. I demonstrated that by experiment. It would not shine as if it was wiped, but it would be bacteriologically clean without wiping. If they take that kind of cream and set it in a pail of cold hydrant water, it will be all right. How many housewives, how many dairymen, who set their cans in water, know why it is? They do it blindly, because they have been told to do it, and still don't know why they do it. Because it simply gets the milk cold quickly. We took pains to educate. I had the grocer send back a can five days old. I asked him why he did it. He said he was afraid to give it out. It was perfectly sweet so far as the taste could detect, and the acid test showed it had not increased in acidity to the point where we could call it sour cream at all. I speak of that to emphasize the value of educating our consuming public. And while that was only a little bit of a spot in the great field, if each one of you created a little spot around where you are, just think how many there would be going inside of a year. Things grow pretty rapidly. You know one germ developing in an hour makes two at the end of the next hour

and then four at the next. How many do you suppose it makes in twenty-four hours? 16,000,000. Just one every hour. Now if you made one little spot in which the public knew more about the quality of milk, and next year we got another and another, how it would increase! Around your neighborhood, as soon as they find out what you are doing, some of them will follow you. Then this gospel spreads, and after a while we can get our public educated to a better appreciation of the differences in milk, and then the man who has got good milk will have it known and a sale for it.

One way that is very effective is to advertise if you have a good milk. And if you can go to your local physician, get five of those physicians to go out to your farm and inspect your place and plant, and in a signed statement say that the herd was clean, the place was clean, that the milk is produced under clean conditions—they would not hesitate to recommend it—you can afford to pay $10 or $25 for a space in the local papers, and then print that statement. If you make the right kind of milk I do not believe you will find many towns where the physicians are not willing to do that. If you have got a city inspector whose word counts, get him to do it, or get any disinterested party. Say to the public, come and see whether they are right.

My talk has been rambling, and perhaps disconnected ,but the whole thing boiled down is this: There are lots of leaks in our dairy business. First, because we don't know them, and next, because we don't know how to overcome them. We have machinery to help overcome those things. We want to increase its usefulness, strengthen our educational field work, and have our dairy show and get these things going. There is a recognition of educational work to-day that is very gratifying and which is so just in proportion as that educational work bears dollars and cents in return. It is useful to the commercial man; it is a help to me if you will come up and see what we are doing at the State College. Anything we can do to serve the state which created the institution and supports it, I shall be glad to do my part in helping . I hope I may have the pleasure of seeing you all up there and showing you what we are doing.

Mr. Stover: Shall we put the milk into a hot vessel after sterilizing?

Mr. Van Norman: Yes . Scald it instead of wiping. Scald it and turn bottom side up on the shelf until you get around, and then when the customer goes out to the street, if that is the way you require them to do, have the vessel carried bottom side up, so the dust will not settle in it. Dust is the airship on which these germs of fermentation and putrefaction ride around.

Mr. Campbell: Would you think that a milk man that peddled loose milk, or a housewife that bought his milk was an ideal milkman or an ideal housewife?

Mr. Van Norman: It may not be the ideal way. It will be the way that will be used for a long while in a great many places.

Gov. Hoard: How many milkmen ever know or take any pains by special effort to educate a family how to take care of milk?

Mr. Van Norman: I know of only two or three . The number is small, but the success of those two or three makes me suggest it.

Mr. Martin: Wouldn't it be better to keep the temperature down below 40?

Mr. Van Norman: Yes.

Gov. Hoard: At a certain place we had 1,500 families in a city we supplied with butter in the winter. The butter was specially delivered to them. It was our experience that we had to make a special missionary effort to teach the average housewife how to care for that butter, in order to save our reputation. May it not be the same also in regard to milk? The average hired girl and the average refrigerator are not always the most savory propositions of the household.

Dr. Barclay: Now, this sermon we have just listened to by the Professor is the truth, the whole truth, and nothing but the truth. When he tells you that cleanliness and cold are the means of caring for milk, he told you, in my judgment, the whole truth.

Gov. Hoard: Is there any cowy odor in the milk, unless there is manure introduced into the milk?

Prof. Van Norman: This much we do know, the new milk aroma is a little different from what it is any other time.

Gov. Hoard: That it is very volatile.

Prof. Van Norman: And very soon goes away.

Dr. Armsby: We have been experimenting by putting an animal into a box, a respiration apparatus so-called, where we analyze all the excreta in the course of that experiment. We pumped air through that box to ventilate it. Most of that air discharged out into the room where we were. The solid and liquid excreta is dumped into a box under the platform, and under those conditions we could scarcely detect any of that cowy odor in the air as it comes out. You can notice it. In a thousand cubic feet of air discharged into the room very little of the odor was noticed. When we opened that box down below, then you get the cowy odor strong, and moreover the particular thing that carries the cowy odor in our experience is the urine, not the solid. With a little bit of the urine on anything that cowy odor will cling to the thing most persistently, so I think the cowy odor is just as you say, it is in the milk.

Prof. Hills: A good many years ago at the experiment station we tried a series of experiments of this matter of aerating milk, at one time in cold water, and another time in artificially warm but otherwise pure air. And what we drew from that experiment was that it was not so much the aeration as the cooling of the milk that did the business. The air, as such, is not a medium which promotes or increases the keeping of the milk. It is the cooling one gets incidental with the aeration. Now, there is another point about this "loose milk"—that is a brand new term to me, I never heard it in New England. One of my associates of former years is likewise a milk dealer, and he had a herd of 750 grade Jersey cows. Up to about ten years ago milk was peddled through that city in this loose fashion, and he was the first one, I think, to put it in the common sense bottle, and he was a man who was brought up in a college atmosphere and one in whom the spirit of investigation was strong. He said to himself, I want to determine whether this is a dollars and cents proposition, to put in this bottling, and I will do it for a year and keep an account. He made a careful estimate. He found that from the standpoint of dollars and cents the putting in of those bottles as a means of peddling milk, as against peddling loose milk, was a saving to him. The question arises, How can that be, when you take into consideration the initial cost of those bottles, and for the mechanism for filling the bottles? He found it to be quite an economy. It did not pay in one year the whole expense but it paid.

Prof. Van Norman: In connection with the bottles, I may make this suggestion. Those of you who take up bottling, or who are making a change in your methods, consider the advisability of paying your driver on the basis of a minimum guaranty, say $30 or $35, and a certain per cent for every hundred bottles brought back.

A Member: What do you consider the best kind of cow stall?

Prof. Van Norman: The stall which will give the cow the most liberty and keep her the cleanest. Each one will have to figure out to suit his own conditions and case.

Mr. Hulton: Would you advocate the use of a manger at all?

Prof. Van Norman: The question of a manger depends upon what you mean. A manger is where the cow eats her feed.

Mr. Hulton: No manger at all, simply a hay rack to feed from, galvanized buckets, and rinse out clean every time you feed. And no feed left in the manger to make dirt.

Prof. Van Norman: Any method that works is all right. If it works it is good. To me the labor of the cleansing of those buckets every day would overbalance the good.

A Member: Haven't you found it is hard to keep the cow clean where the manger is used?

Prof. Van Norman: If you can keep the cow back with her heels on the edge of the trough, you can keep her cleaner. Now, then ,does the advantage of the loose bucket that has to be washed after each use, pay for the labor?

Mr. Norton: It was moved and seconded that a committee of three be appointed to nominate officers for the ensuing year. Motion seconded and carried.

The chair appointed Mr. W. C. Norton, Henry Palmer and J. F. Lantz.

Recess until 2.30 o'clock.

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## AFTERNOON SESSION

Meeting called to order by the President at 2.30 o'clock P. M.

The President: The first order of business is the election of officers.

(Committee on nomination and auditing committee reported not ready.)

The President: Are there any resolutions or miscellaneous business to be presented? If not, the first regular order of business is the discussion provided for by vote this morning, on the general question of Dairy Inspection, we may so phrase it, not milk inspection but dairy inspection, inspection of the sources of supply. I call upon Gov. Hoard to open the discussion .

## HOARD ON INSPECTION

Gov. Hoard: Mr. President, I am quite familiar with all the work which is being done to-day in Wisconsin. Let me say in the first place that we have about 3,000 cheese factories and creameries, and we have somewhere in the neighborhood of 150,000 to 175,000 farmers contributing milk to those institutions. We have been confronted, in the progress of our dairy work, with the difficulty of securing cleanly work on the part of the cheese factory and the creamery and the farmer. We have suffered severely in the revenues of the state. We are suffering in Wisconsin, just as you are in Pennsylvania, from the indifference of the farmer to his own education. A large proportion of the men who supply milk to the cheese factories and the creameries in Wisconsin do not read a word. I would say not over fifteen or twenty per cent of the men in Wisconsin who supply milk ever read a word on dairy subjects. That is a larger per cent than is to be found in almost any state. It cuts out a large percentage of his profit, it makes him helpless before the difficulties of his own position. You cannot put the knowledge and understanding into his mind if he will not familiarize his mind with principles. In like character, but not to that extent, do we find men running cheese factories and creameries in the state who won't read or study, and who have no contact with information. I think the most powerful word in all the English language is that one word of seven letters, c-o-n-t-a-c-t. Men educate themselves and grow in knowledge and understanding in proportion as they have contact, with books, ideas, things, men. Now, when a man refuses himself contact, what then? By an inverse ratio he becomes not as gods, knowing good from evil, but becomes a helpless creature to his environment. Now, we found hundreds of men running cheese factories and creameries in an unsanitary condition. We found ignorance deified, ignorance worshipped, rolled as a sweet morsel under the tongue, men worshipping ignorance. Let me give you an example. In one county in Wisconsin, occupied chiefly by Swiss people, ten million pounds of Swiss cheese is produced. We could not get those Swiss people to have any affiliation with our educational movement, with our dairy association, with our dairy conventions, with our farmers' institutes. Like the average German everywhere throughout the world, they were full of their own racial prejudice, and I am part German myself. These Swiss people were full of their own conceit, and nobody on earth knew as much about making cheese as they. All at once there broke out through that district a tremendous disaster. One factory lost $3,000 worth of cheese, the cheese were bursting with fermentation. As one old German said to me, "What you call the devil is to pay." "Yes," I says, "I guess so." For the first time in their lives they saw they needed the help of science on this question, and that their conceit did not help them a bit, and they appealed to the Wisconsin association, and we sent an inspector to examine the condition of things. And what do we find? In the rear of each factory was a row of barrels, sunken in the ground, and each patron had a barrel, and every patron's whey was put into that barrel, and that barrel had not been cleaned in years, and the patron put that stinking rotten whey into the can that he brought his milk to the factory in, and took it home, and then the housewife cleaned, and maybe she did not. Anyway, the milk came back to the factory reeking with bacteria and fermentation and all things whatsoever vile and unrighteous. And what was the result? Thousands upon thousands of dollars lost to those people because of self-conceit and ignorance. Now, then, we finally prevailed upon those people to listen. Professor Russell, our bacteriologist from the University, was sent down, a very practical man, not only a scientist of the very first water, but a constructive, practical man as well. And he went down there, and he did what he could, and we sent the inspectors, and the inspectors went around among these different creameries, and these cheese factories, and commenced to teach that cleanliness was among the first fruits of righteousness and good cheese making. The difficulty was cured. These men, for the first time in their lives, saw how they had corrupted their own fortunes. That is one of the things an inspection force was able to do.

### In Minnesota and Wisconsin.

Now, then, we found that finally we worked up a sentiment in Wisconsin to such an extent that we prevailed upon the legislature last winter to give to the dairy and food commission an additional force of eight inspectors, an additional chemist, so now the dairy and food commission has a force of I think 14. Minnesota is ahead of us. She spends about $30,000 a year in fostering and promoting the dairy interests. Wisconsin will stand in the neighborhood of twenty to twenty-five thousand. Wisconsin has been paying to its own state dairymen's association, not an incorporated body, a body which I may say I first organized myself in 1872, $2,000 a year for doing educational work in the state. Now, then, we have got our forces into shape. What have we done? We have prosecuted 24, dirty, filthy cheese factory men after sending an inspector around and saying to those men, "You must conduct your factory according to law; your factory is in an unsanitary condition. You have no right to ask the patron to be clean in his milk if you are not and will not be clean in the handling of it." Those men paid no sort of attention to this work. The inspector went there a second time, and they laughed at him, and some of them threatened to drive him out of the factory. Ignorance, Ignorance! There was a time when God winked at ignorance, but He got tired of it. Ignorance! The conceit of ignorance, the willfullness of ignorance, the danger of ignorance. What result? Commissioner Emery proceeded to prosecute these 24 men for keeping their factories in an unsanitary condition, and they were fined severely—from $25 to $50 apiece. Then there was a waking up and a shaking of dry bones. Creamery men have been prosecuted. Now, the law says, in addition, that no farmer shall bring milk to a cheese factory of creamy in an unsanitary condition. And the law bears upon the milk producer as well as the milk handler, and I want to say to you gentlemen that I never saw such a quickening of the dairy sentiment of the state of Wisconsin as has happened since the passage of these laws, and the beginning of their installation. Now, this is an important thing, a very important thing to all of us.

### They Woke Up!

Now, I say this about the inspection business, that one of the most valuable things to-day is that it compels the farmer, stops him and compels him to exercise his mind. He begins to say, "Well, what is this thing that is going to happen to me?" And you will find that at the cheese factories and creameries, the patrons will come together; it provokes meetings among them. The creamery man, the butter man is called on to explain to these people what this law is, and there is a beginning to face, for the first time in their lives, the actual real responsibility of their action before the law. That is conducive to thought, and that compels men to study. I want to say to you, gentlemen, we have never seen anything that has taken hold of the mentality of Wisconsin, particularly the agricultural classes, like the establishment of this system of inspection throughout the state. Now, I believe, I know, that Pennsylvania is a great dairy state, if it only knew it itself. In Pennsylvania you are like a great rope of sand. You are not organized, you are not compact, and you are not put in the shape where you can act and re-act on one another. Wherever in the United States you find a state so organized and so compact that its action and re-action, flection and reflection, upon one another, in this state legislation has followed and the state has been put upon advanced ground. You will find in every instance that great financial prosperity has followed such action. And if I were to appeal to you from no other consideration than that of the most sordid character, the dollars and cents there are in it, I would say, move upon your legislature under wise direction for the enactment of such laws, and for the creation of such forces.

Mr. Norton: What brought to my attention to this matter in the first place was I found we had no way of making our patrons make good milk. They would keep their cows dirty ,and bring us dirty milk. I got to thinking over the subject. I saw that this dairy inspection law in Michigan and Wisconsin was working well. I could see no reason why our state should not have a similar law. As Gov. Hoard has stated we are behind the times in Pennsylvania in our interests as dairymen. It is time we woke up. You cannot make pure milk out of milk that is contaminated at home. Dairy inspection must begin at home. It does very little good to inspect that milk after it reaches the city, or after it reaches the creamery. You cannot pasteurize the dirt out of milk. Mr. Reichert brought up the question this morning he did not believe in a compulsory law. Well, I do not know; I have had a good deal of experience with farmers. I know a great many men unless you have got something that will compel them to do a thing, will not produce a good article. It has to be compulsory. In my mind a law that is not compulsory is no use in Pennsylvania. I do not know what it may be some other place I think I can safely say the Breeders' Association of the state will be ready to help you all.

Prof. Hills: The result of the inspection in our state has been to lessen the amount of butter that is made.

Dr. Barclay: It seems to me that this question is one of paramount importance, and that milk, as all other products, should be sold at its real value. If we had a law that would compel inspection and that would pay the producer the real value of the product, it seems to me that would encourage and benefit the dairyman.

Mr. Wagner: Possibly we might have force added to the Live Stock Sanitary Board. I would like to hear from Dr. Pearson what the Live Stock Sanitary Board is doing in the way of improving the condition and output of the dairies of the state; also whether he could not give us some plan or suggestion by which we could improve the product by adding to the force of the Live Stock Sanitary Board.

Dr. Pearson: This subject is one I am very much interested in, and I think that I can see in this direction a chance for great dairy improvement from every standpoint, from the standpoint of the purchaser of the milk, the creamery man, and of the consumer. When dairying was conducted in a simpler way than it is now, before the days of co-operation, a fault on the part of one producer injured his own product, but did not injure the product of his entire neighborhood. Now, under co-operation and under the creamery system, a few careless producers not only injure their own product, though it sells for a lesser price than it otherwise would. but they injure the product of their careful neighbors. Apparently there is no effective way of reaching these careless men excepting by some sort of inspection ,and as Mr. Norton has brought out, there appears to be no particular advantage in rules or laws of inspection unless there is some means of enforcing them, unless some penalty is provided for violation of the standards that are adopted. If such a thing as this is carried through I should be in favor of a very moderate standard to begin with, but with the understanding that these standards would be increased as rapidly as the conditions of the trade warranted. In my work as State veterinarian I come across some places where milk is produced that cannot but be of tremendous harm, both with relation to the character of the producer of milk, the milk value, and the product, and also with regard to its wholesomeness. There is, at present, no general inspection law under which a joint inspection can be made with a view of discovering such conditions, and I think that it would be a step in the right direction and a step decidedly progresssive to take some action such as has been proposed.

The President: This is an important subject, and I hope we shall not leave it without taking some action, looking towards the accomplishment of some practical results. It is a good thing here to-day, and if we limit ourselves to that discussion, we shall not accomplish very much.

Mr. Norton: I have a resolution.

The President: That would be in order.

Mr. Norton reads resolution as follows:

RESOLVED, That the Pennsylvania Dairy Union advocate the passage of laws requiring efficient inspection of places where dairy products are made and handled. And further that the Board of Directors is hereby instructed to look up the laws of this and other states, and see that a bill is introduced into the next legislature to secure such inspection.

The President: What action will you take in regard to this resolution?

Moved that it be adopted. Motion seconded.

The President: Is there any discussion?

Mr. Reichert: I should like to ask a question if it is in order. It seems to me, that in order to get the greatest amount of good out of any bill that we might present to the legislature, that there should be a committee to consider the character of the bill that is to be presented, and that all the members of the Dairy Union throughout Pennsylvania, in fact all dairymen, should be invited to send communications, with suggestions to that Committee, so that in addition to getting the benefit of the laws in the other states we would have the suggestions of our own dairymen throughout Pennsylvania, and make a law as thorough as possible. It seems to me that would be the shortest and the best plan to get at it.

Gov. Hoard: Why not create here a committee on legislation?

Mr. Reichert: That would be better, and then invite ideas.

Gov. Hoard: To whom the propositions come, with instructions that they prepare from all this date a suitable law to be proposed to the next session of your legislature.

Mr. Reichert: That is my idea exactly, to get the views of all of our people throughout the State to give the committee a chance to know the wishes and opinions of the people through the State. I think that would be a very desirable way to get at it.

Mr. Reichert: Has the chair some plan by which we can embody that in that resolution?

Mr. Norton: We decided we would leave that in the hands of our directors. No one is more alive to the interests of the Dairy Union and the dairy people of the state than our board of directors. In the resolution you will also see it gives them the authority to get the laws from not only our own state, but from other states before drafting this bill. Now, so far as the bill is concerned, that is something we cannot do to-day. It has got to be left with these men to draft, and I personally think it should be left with the board of directors.

Prof. Van Norman: There is nothing to prevent the board of directors, if they do not care to undertake it ,appointing a committee from their number to take charge of this thing, to be a legislative committee.

Mr. Wagner: The board of directors can gather all the information they choose on the subject, and present it to the next annual meeting which will be before the meeting of the legislature, and the bill can be discussed at the next annual meeting unless it would be possible to bring it up at this present session.

Mr. Norton: I do not believe that this ought to be left for the next annual meeting. I believe that the incoming board of directors and president and secretary should take this matter up at once. My experience in the legislature is you do not want to wait until the last minute before the legislature convenes. I may be wrong, but if you want to put this in form of a motion, I feel that it ought to be left with the board of directors to pick a committee here to-day. I don't know whether they will wish to do that or not.

Mr. Statton: I am from the Buckeye state, and I have had some connection with our

State Dairy Union there. We have not got the legislation we want, but we have not been hustling as we would like to see you hustle. It takes a lot of nerve and push to get a thing like this through, and this board of directors will certainly have that if they are heartily supported by the people. There is no better way to inspect people out of business than to set out in this inspection, and there is no better thing for the dairy industry of Pennsylvania and Ohio than to inspect about one-third of the dairy people out of the business that are now in it.

The resolution being put to vote, it was unanimously carried, and the board of directors are instructed accordingly.

The President: We will now listen to an address by Prof. C. B. Lane, of the U. S. Department of Agriculture, on "Some Phases of the Dairy Industry."

# SOME PHASES OF THE DAIRY INDUSTRY

**Prof. C. B. Lane, U. S. Department of Agriculture.**

This has been a year of great prosperity to the dairymen of the country. Both butter and milk have sold for higher prices than last year and these combined with increased production have given a value to dairy products of fifty-one million dollars above the estimate of a year ago. The income of the dairy cow is only exceeded by the corn crop. It is significant that when the dairy farmer is prosperous others who have anything to do with the development of the dairy industry share in the profits. For example, the dairy supply houses, dairy publications and manufacturers of dairy products of all kinds. Our population is increasing faster than the supply of dairy products. I believe, therefore, we can expect profitable prices for high-class products for some time to come.

## Quality of Dairy Products Improving.

In spite of the sensational articles which frequently appear in the daily press, to the effect that milk is produced under filthy conditions, that typhoid and scarlet fever are disseminated through milk, that butter is adulterated with renovated and cotton oil, and that cheese is poor in quality, when we take a broad view of the matter we find that dairy products as a whole were never better than they are to-day. Take, for instance, the milk supplied to the city of Boston. One of the up-to-date milk contractors recently had the milk from the entire number of farmers (119) furnishing him with milk from a single town, examined for bacteria, and they found that only 2½ per cent below the Boston requirements. This may be taken as a fair illustration of the condition of things in a community of intelligent milk producers.

Again, the mortality of children under five years of age has been reduced from 43.84 per cent in 1875 to 28.87 in 1904. Both New York and Philadelphia show a similar improvement. There can be no doubt but that this improvement is due in no small degree to the better farm conditions and better laws and health regulations. The result of the recent case in Philadelphia, where two grocers were fined $250 each and sentenced to 60 days in the county prison for supplying oleo as a substitute for butter, shows the activity of inspectors to put down fraud.

The demand for high grade products is increasing. Many of the certified milk producers are unable to keep up with the demand for their products. One party I have in mind, who is selling the milk from 500 cows at the rate of 15 cents per quart, told me that the demand for their products was so great that they were already preparing plans for a barn to accommodate 800 cows. Another made the statement that if he had a million dollars to invest he would put it into the production of certified milk. The demand for milk of high quality that is not sold under a guarantee is no less noticeable. Many have advanced the price with the result that they have not only held their regular customers, but added many new ones.

## Practical Results of an Experiment.

A discussion of this matter from the practical side will doubtless be of more interest to dairymen. I wish to give here some of the actual results secured from the dairy herd at the New Jersey College farm, when in my charge, and the sale of its products in retail trade . The sale of milk was made in competition with other dairymen, without any other advantage than a good product. The number of milch cows in the herd ranged from 23 to 30 and they were largely grades. The composition of the milk of the different animals ranged from 2.8 to 6.4 in percentage of fat, and averaged 4.3 per cent. The standard of richness for the milk as delivered to consumers was fixed at a minimum of 4.0 per cent fat, as it was found that with care in the arrangement of the animals in the barn. so that the milking might take a certain order, it was possible to furnish from day to day, a product that was practically uniform in composition. This herd served in carrying out a practical experiment on a large scale, to determine whether uniformity, richness and purity could be practically accomplished, and whether, if these characteristics were possessed by milk delivered to consumers, the result would be a larger consumption at a better price. The experiment began in 1896, and during that year it was only possible to in part guarantee uniformity and richness as it was necessary first to improve the buildings in a sanitary way, remove the unhealthy animals, arrange for better cleaning of the animals and stables and for proper handling of the milk, and to teach all connected with the work the importance and necessity of cleanliness. This was not finally accomplished until late in the summer of 1897, when a dairy house was built, which enabled an immediate and rapid cooling of the milk and its storage at low temperature until delivered, as well as the sterilization of the necessary utensils. In the meantime, however, the relative advantages of different methods of delivery were studied, and the marked advantage of the bottle system from the sanitary point of view was so obvious that the consumers were encouraged to take milk in this form rather than from the open can.

The product was sold entirely upon its merits. No persons were solicited to purchase milk, no advertising was done, and in no case was the milk sold for less than six cents per quart for the six months beginning with May, and for eight cents for the the remainder of the year. The sales made during the year beginning April 1st, 1896, when progress was being made in the production of milk of a uniformly high quality, and during the years 1898 and 1899, when to these characteristics purity was added, are actual statements taken from the records. The results are as follows:

During the year beginning April 1st, 1896, the sales were 64,616 quarts; the following year (1897) the sales were 68,230 quarts, the gain being but 3,614 quarts, or 5.6 per cent more, while in 1898 the sales were 78,839 quarts, a gain of 12,373 quarts or 18.9 per cent over the sales in 1896. Again, the sales for 1899 were 81,930 quarts, the gain being 17,314 quarts, or 26.8 per cent over the year 1896. That is, though uniformity and richness were practically maintained throughout the first two years, owing to unclean animals and stables there was frequent complaint of bad flavors and souring, and sales increased slowly, but as soon as the milk delivered possessed the three characteristics mentioned at the outset—namely, uniformity, richness and purity—it began to sell itself and no legitimate complaints were heard. The increase was marked and has been increasing from year to year; in fact, we have sometimes had 25 customers on the waiting list. The increase in sales of 18.9 per cent in 1898 is, on the average, 33.6 quarts a day, which, at the price received, an average of 7 cents a quart, is a total gain to the farm of about $1,000.00 in the annual income. This is obtained too without other increase in the cost than in the extra animals required and in the feed, the labor required for handling the milk, both in production and delivery, is the same as that found necessary in the smaller product. The results of this experiment show that there is wide room for development along this line, that dairymen can, by attention to these matters, both increase their sales and secure a better price. The key to the situation is the making of a better product.

A statement of the September receipts for milk in New York City shows that there was a total increase of milk, cream and condensed milk over the same month in 1894 equivalent to 84,848 cans of plain milk. This should give some encouragement to the producers. The conditions for manufacturing butter in this country are as good as in any, and one reason we do not produce more high grade butter is because of carelessness on the part of creamery and cheese factory patrons. We are eating all the high-class butter we produce and millions of pounds of oleo, butterine and renovated butter besides. Of all nations, the Americans are the great butter eaters. This cannot be said of cheese, and the consumption of this product should be encouraged because it is both a healthful and economical article of food.

## Production Too Low.

One of the weakest points in American dairying is the low production of our cows. We certainly cannot point with any pride to the record of the average cow in the country, which is about 3.560 pounds of milk and 152 pounds of butter. I believe it is safe to say that more than one-half of nineteen million cows do not pay for the food they eat. To illustrate: Of one hundred herds in a New England state recently canvassed by "Hoard's Dairyman," the average pounds of butter fat produced per cow, per year, was reported to be one hundred and fifty, equivalent to one hundred and seventy-five pounds of butter. This is a little higher than the average for the herds for the whole country, it is true, but it is only about two-thirds of the yield that could readily be obtained with care in selection and feeding. Sixty-nine herds out of the one hundred failed to pay for their feed. The best herd returned $20.75 per cow more than the pay for their feed. This record can easily be made by every dairyman. The owner of the poorest herd lost $21.68 for every cow in his herd of sixteen, which is more than the best herd gained. Patron 80 which had the most profitable herd (made up of grade Jersey cows) it is reported, gave them the most intelligent care. Hay and corn fodder formed the roughage, and 4 to 7 pounds of wheat bran and cotton seed meal were fed, while the cows were in milk. A warm, well lighted stable was noted. He was a reader and careful student of the needs of the dairy cow. Patron 74 had the poorest herd, made up of 16 grade Jersey cows also. Hay and a small amount of ensilage were fed and about six pounds of brewers' grains, wheat, bran and cotton seed meal. The trouble here was not with the ration, but poor cows and poor care. The business must be studied from all sides. Here we have a difference of 112 per cent in two patrons living less than a mile apart, under practically the same conditions, and a difference of $42.40 in the net income per cow. . The difference in profit must be attributed largely to the difference in the intelligence put in their business. Here is an opportunity for dairy missionary work that I believe would be appreciated.

Many dairymen make the mistake of thinking that it is enough to know what the whole herd produces month after month, and what the whole herd tests. They depend too much on the returns from the creamery or cheese factory. Let us analyze this plan and see how much it will help to improve the herd in the future. It does not help any. To be sure, it enables you to compare one month with another; it shows you the average for your herd. We will say this is 4 per cent, which is good for a herd of grade cows, but you may have some cows that test 5 per cent fat and others that test 3. The low test is not so bad as it seems provided the cow gives milk enough. Let us see how this figures out. A cow giving 5,000 pounds of 5 per cent milk would produce 250 pounds of butter fat. A cow producing 8,300 pounds of 3 per cent milk would also give you practically 250 pounds of butter fat. But suppose a cow gives you only 3,600 pounds of milk, which is about the average for the cows of the country, even if this contains 5 per cent fat the chances are that you are losing money. Even the best of cow experts cannot tell by the looks of a cow what quantity or quality of milk she will give. A thousand pounds of milk in her annual yield one way or the other may determine between profit and loss. Again, many cows go dry a month or six weeks longer than they should. This often puts them on the unprofitable list. Many cows leave worthless heifers in the herd which continue to eat up the profits and keep the dairyman from having some of the luxuries of life which every man in the dairy business and every kind of business ought to enjoy. So we see every dairyman

ought to look to the future as well as the present and to build up his herd on a solid foundation.

Everything in these days is measured by its capacity for work, or, in the case of the cow, by her production. A man is paid, or ought to be paid, for his ability to work, either with brain or muscle. The value of a trotting horse is measured by his record. The value of a dairy cow depends upon her capacity to produce milk or butter. That is her actual value, but is that the basis on which she is valued in our dairy herds as you see them through the country? Strange as it may seem, most dairymen have no basis—old brindle or spot, while they may not pay their keep, have been in the herd so long that they have become old friends and their owner loathes to part with them. If we are dairying for fun, all well and good, but if we are conducting it as a business it is time the dairymen used business methods. It is not enough to know that a cow gives a pail full of milk, when she is fresh; we want to know what she produces in a year. Dairymen have a good goal to work for in the record of the Guernsey cow. Yeksa Sunbeam, who produced an equivalent of 1,000 pounds of butter in one year, from 14,020 pounds of milk. This record was the result of careful work in breeding, feeding and all that pertains to the health and comfort of a cow.

## Cow Test Associations.

I want to endorse the idea of establishing Cow Test Asociations. The first in this country which was organized in Newaygo county, Mich., September 26th, has now adopted constitution and by-laws and began work October 15th. Other states should fall into line. These associations cannot fail to be strong agents in improving the milk production of the herds of the country. The various associations should get together and adopt uniform systems of keeping records so that ready comparison can be made of the production of the herds in different sections of the country. This will naturally result in competition for highest records and a desire on the part of each association to make a reputation for the section of country they represent.

The plan is practically this: 15 or 20 dairymen form an asosciation and pay one dollar for each cow per year to help defray the expenses of the test, hire a competent person to do the work, board and lodge the official tester while at their farm, say once in two weeks, buy all the necessary apparatus and make all arrangements to have the work carried on accurately and systematically. The tester visits each farm regularly, weighs and tests the milk from each cow, figures out proper rations for each dairyman and gives such advice as he may need. At the end of the year the dairyman has a reasonably accurate record of every cow in his herd, and he knows what it has cost to keep them, and he can easily discard the unprofitable animals.

## Many Dairymen Would Improve Their Condition if They Were Told Exactly How to do It.

I was interested in going through a barn a short time ago where the dairyman took much pleasure in showing me his herd, and he stated that he thought his conditions were almost ideal. While there was some improvement noted over other barns in the vicinity, such as the swing stanchions, a fairly good floor for the animals to stand on and a gutter behind the cows to permit of easy removal of the manure, on looking at the conditions more critically it was noted that there was not more than one small window to every dozen cows, that the ceiling was low, allowing less than 200 cubic feet of air space to each cow, that the mangers were heavy wooden structures with decaying feed in the corners, that cobwebs were hanging from the ceiling and the wall in the rear of the cows was coated with manure. This dairyman was willing to receive instruction and have undesirable conditions pointed out to him. He had seen but few dairies outside of his neighborhood and really didn't know that there was anything better.

## The Man Behind the Cow.

Among the factors which enter into the economical production of milk, the man who handles the cow is the most important. The man who naturally likes sheep or who would rather feed steers than cows or who has not a keen interest in dairying will not produce milk economically and will not keep his cows up to their highest production. Then a man should select a breed which he likes, a breed which he is ready to advocate to his neighbors and to stand up for on all occasions. There are men who would rather have specks in their butter than spots on their stock. The man behind the cow must be a man who treats her kindly, a man whom the cow likes to have around. If she chews her cud during milking time you may know that all is well and that she is doing her best at the pail. We must see that the cows are comfortable all the time. The Kansas station in a recent test found that cows exposed to a temperature ranging from 18 to 50 degrees for several days at a time lost 12 per cent in quantity of milk, and 11 per in butter fat. These animals were fed three pounds more of the grain ration, but their weight was approximately the same, the loss including feeding amounted to $.07 per cow per day. (There were 52 days when the thermometer registered 32 degrees or below.) Accordingly, the total loss for the year per cow is $2.24, or $48.80 on a herd of 20 cows. We see here how much depends upon the man behind the cow.

## The Milking Machine in Milk Production.

The contentment of the cows is very noticeable where some of the milking machines are being used that have come the nearest to perfection. I have seen a whole line of cows that were being milked with machines chewing their cuds as if nothing was going on. Where the teat cups are carefully adjusted to each cow to her satisfaction and comfort and the same size used on the same teats attached to the same machine with the same degree of vacuum produced by the same power, you practically have the same milker and a good milker at every milking every day. If this is not conducive to good results I do not know what is. Now I am speaking of the milking machine, I want to say that I believe it is one of the advance steps in dairying. I have watched its workings very closely for a month and the results obtained indicate that it is entirely practical. That it is a labor saving device there is no question. For example: Two men with the machine will milk a herd of

60 cows in less time than it requires four men by hand. This makes it possible for the other two men to go into the fields with the teams early in the morning and work until evening, as it is not necessary for the drivers to take part in the milking. This is no small item, as on many farms it would amount to $10 per week in cash and for 30 weeks a net saving of $300.

The scarcity of milkers and the unreliability of many of them has had a tendency to keep many men from going into dairy farming. Some dairymen who have been in the business have been obliged to give it up for this reason. Great interest therefore centers around the milking machine, especially where scarcity of labor exists. It not only requires about one-half the labor to milk the cows, but it is believed that the labor employed will be of a higher class than heretofore, and will also command higher wages. It is believed, further, that the advent of the milking machines will have a tendency among farmers who now have small dairies to enlarge their plants and to make dairying their chief business. The trouble has been in the past that too many farmers have made dairying secondary to other work, and when anything had to be neglected it was always the dairy, and for this reason the profits from their dairies have been small. Where the milking machines have been introduced they have influenced dairymen to clean up their farms and to take more pride in their work. This naturally will result in the production of cleaner milk and in some cases better prices. Any practical apparatus which has a tendency to improve dairy conditions should be welcomed by the industry.

### The Milking Machine Must be Kept Clean.

If the milking machine is not kept sanitary it will be a step backward rather than forward in the production of milk. Actual tests have shown that where the machines were cleaned by simply rinsing in warm water the bacteria in the milk drawn by them runs up into the millions per c. c. On the other hand, where boiling water or the steam sterilizer is used in connection with germicides, the bacteria in the milk may be practically reduced to the infection which comes from the cow teats. In some cases the test has been as low as 400 bacteria to the c. c. It will be seen therefore that the machine offers great possibilities to the producer of high-class milk. Success here depends upon the man behind the milking machine.

The milking machine will work out in practice very much the same as the farm separator. When separators were distributed by the thousands through the West, the farmer, at the start at least, didn't keep them clean and the result was a lower grade of butter at the creamery. But when the farm separator is kept clean the cream coming from it is fully as good if not better than when separated at the factory. Success depends upon the man here again.

### Dairy Qualities as Measured by Product.

I believe the time has come when we should pay less attention to the form of the dairy cow and more attention to her power to produce milk. It is all right to have dairy type, but production should go with it. During the past few months I have compiled some ten thousand records and secured photographs of many of the cows in each breed having the highest records. While these high record cows are not such as would be selected for their good form in many cases, yet they have the productive capacity as shown by the scales.

### Department Trying to Get Closer to the Dairymen.

In the earlier part of the Dairy Division of the Department of Agriculture the main object in view was to collect and disseminate information on all phases of the dairy industry in this and other countries. Seventy bulletins have been prepared during the past ten years TELLING dairymen facts about the business and how to carry it on, but more recently we have seen the necessity for taking more information direct to dairymen and SHOWING them by means of object lessons and in a practical manner how to do things. I have only time to just mention a few of the lines of work that have been taken up from this standpoint. One that promises to be very helpful and practical is the establishing of what may be termed "demonstration farms" in the South. For nearly a year a dairy expert has been traveling from place to place through the Southern States looking up the conditions and favorable localities for establishing demonstration farms. The idea is to assist in making these farms models in every respect so that dairymen in the surrounding country will have a place where they can see for themselves modern methods of dairy management.

Another line of work that has recently been taken up and which is attracting widespread interest is the improvement of dairy barns. This is really a campaign for clean milk. The subject is of great importance from the standpoint of health when we consider that milk is used daily by almost every family in the country, and that the milk produced annually amounts to over seven billion gallons. There is no question but that there is need for much improvement in this direction. Ask the dairy inspectors through the country what they find and they will tell you that a large percentage of the barns are dark, damp and poorly ventilated, and have the odor of manure and other decomposing matter. These conditions contribute unhealthy germs to milk and keep the cows unhealthy. Since the Dairy Division began the work of improving dairy barns letters have been received almost daily asking for plans showing proper barn construction. Plans and specifications are now being prepared by the Department architect and some have already been furnished to a number of dairymen. We hope soon to have plans drawn for types of barns suited to different sections of the country, so that dairymen in any particular section can have a plan suitable for their conditions. It is as easy and cheap to build a barn right, observing conditions which contribute to sanitation, as to build it wrong. We do not expect to reform the whole system in a few weeks but we want to help the poor farmer as well as the rich to have the best barns possible. It is hoped to soon extend the work to include silos, dairy houses, ice houses, etc.

The Dairy Division is also carrying on work in co-operation with Experiment Stations and studying problems in butter and cheese making, transportation and storage.

There are many other problems which need attention, among them may be mentioned breeding for more profitable cows, questions of feeding for flavor and color in butter, regulating the amount of moisture in butter, pasteurization of milk, etc. The Government desires to solve these problems and many others. We can accomplish much more if we have the asistance and sympathy and co-operation of your association, as well as those of other states.

President Armsby : We will postpone the discussion of this paper until we hear from Director Hills, who will tell us some Things Science Has Done for Dairying."

# SOME THINGS SCIENCE HAS DONE OF LATE FOR DAIRYING

Prof. J. L. Hills.

Mark Twain in his inimitable "Roughing It," tells us of a revolver which "if it didn't get what it went after it would fetch something else." Concerning it he further remarks that when fired "there was no safe place in all the region round about but behind it."

Now my talk to you to-day bids fair to be somewhat like this "dismally formidable" weapon. It is a scattering discourse, and there is "no safe place in all the region round about it;" for it is aimed at the man beside the cow who milks her, and the man in front of the cow who feeds her; at the man who separates her milk, and at him who churns the cream; at the cheesemaker, at the creamery manager, and at the maker of market milk. You are all in line with its muzzle, but luckily it is not loaded with fault finding ,but with facts. What I have to say breathes of optimism rather than pessimism. The message of modern science to dairying is helpful and inspiring, though it often lays upon the individual a greater responsibility because of increased knowledge.

What are some of the things which science has done of late for dairying? Let us at the outset get a clear conception of the meaning of the word science. The last generation of farmers almost to a man balked at it, and many to-day look askance at it as in no way allied to or helpful in the pursuit of their calling. This attitude seems in part due to misunderstanding as to what science is and does. Science indicates the results attained in the search for truth, grouped in such a manner as will aid in showing the relationships of these results to each other. Science, in other words, is "an orderly arrangement of well ascertained facts." The results of some lines of research may seem at times to be quite without practical bearing. But we should remember, when tempted to style any such work as useless, that a notion which is derided by one generation as impracticable, or ,indeed, false, often becomes an everyday affair in the next generation. For instance, the inventor of photography was placed in an insane asylum because he claimed he could transfer his likeness to a tin plate; Franklin's ideas as to the nature of lightning were laughed at, and Galvani was called a fool and "the frog's dancing master" because of his study of galvanic electricity.

Science does not pretend to say the last word. It formulates theories to discard them as new discoveries lend further light. It, like practice, is ever an evolution. Hence it follows that I may tell you some falsehoods to-day; nothing that I know to be such, yet, notwithstanding, untruths. My statements represent what I believe is held to be true to-day, but which 20, 40 or a 100 years hence may be otherwise regarded. This does not imply that present conceptions are useless, though they may be erroneous. They may prove helpful, even if they are not immutable.

To cover all that science has done even in this one line, were impossible. One must draw the line somewhere; hence I speak only of "some things" which have been done "of late." My talk on this account is disjointed rather than connected, and suggestive instead of didactic. I shall take it for granted moreover that you have a grasp upon certain of the fundamentals, for a dairymen's meeting is on a higher plane than a farmers' institute. It is the high school as it were of the modern instruction of the adult farmer, and consequently we may assume something for most of those who attend its sessions.

### Feeding Problems.

What are some of the points which have been developed touching the feeding of dairy cows?

1. The limitations of feeding standards are better understood and the protein statement of the German standard balanced ration is under review.
2. The home growing of adequate supplies of protein is a more practicable thing, thanks to soil if not seed inoculation with nodule-producing organisms.
3. The "best" grain feed is better known.

Professor Haecker, of the Minnesota Station is emphatic in his belief that we feed cows too much protein. He shows several animals with good records which for years had eaten only 1.5 pounds of protein daily. Five years' study at the Vermont station of the relationship of varying grain rations to profit and to bovine well-being as well as a survey of work elsewhere leads me to believe that the German balanced ration's call for 2.5 pounds of digestible protein is usually an over-loud cry. But on the other hand I am not yet ready to accept Haecker's results as applicable in the East. In fact among the later conceptions of science is found the notion that feeding standards resemble India rubber rather than cast iron, that they are helpful as guides rather than as rules, and that protein is not, in the slang phrase, the "whole thing." Feeding standards are differentiated into:

1. The physiological standards, which are based on animal needs and maximum production, and are couched in mathematical terms; and
2. The practicable standards which are essentially home made, based upon and guided by the physiological standards, and which are more or less variable according to circumstances. Such a conception of the feeding standard proposition enhances their usefulness to the careful feeder.

What is the "best" grain feed for cows? There is no best expressed in terms of pounds or measures of roughages and concentrates; but there are many thoroughly good ones. If the grain ration carries digestible protein in sufficient quantity, and is made up of three or more ingredients, all palatable, none injurious to the milk and its products, and one of them at least mechanically a lightener of the ration—as for example, wheat bran or distillers' dried grains—it may be expected to be physiologically satisfactory. If then a trained judgment and a due regard to economy enter into the foundation of the ration, one cannot go far astray. Five years' work at Burlington with restricted and with heavy grain rations of many sorts, as well as the study of the results of similar work elsewhere, leads me to believe that, given:

1. A class of cows making 250 or more pounds of butter,
2. Plentiful supplies of early cut hay, carrying some clover, or if it can be grown, of alfalfa hay and of mature corn silage or apple pomace silage,
3. Grain prices as they rule to-day;

A six-pound ration of judiciously chosen by-products is in the long run as close an approximation to the best as we are likely to arrive at in this vale of mystery and doubt.

## The Milking Machine.

What has research discovered of importance to the milker?

1. An apparently successful and practicable milking machine.
2. Further insight into the losses due to incomplete milking.

I saw in December, 1904, and again last Monday, a milking machine which had now been in practical operation in a large herd for about three years, with apparent success. It is also in use in several other dairies. This machine seems simple, is readily cleaned, does not irritate the cow, strips better than does the average milker, though after stripping is advisable; is rapid in its work, but is likely to prove costly in initial expense. It goes without saying that a mechanism of this kind fills a long-felt want. If ,as it would seem, its inventor can really cry "Eureka," it is a marked triumph of applied science.

I just remarked "strips better than the average milker." It is well known that the average milker gets less milk than he who does a thorough job, that incomplete milking means not only direct but indirect loss, not only an immediate lessening of the fat yield, but tends towards drying the cow. A Danish scientist has recently developed a special system of udder manipulation, a sort of massage of the mammary gland, as it were, which it is claimed augments the flow and which has a sound basis physiologically. Its conduct involves three manipulations, each thrice repeated or until no more milk is obtained; first the pressure of the quarter on each side against each other thrice repeated, followed by removal of the milk; second, the pressure of the glands together on each side, the fore quarters first being manipulated and then the hind quarters, followed by removal of the milk; and, third, the fore quarters are pressed between hand and body, the hands holding the teats loosely, then the hind quarters also, followed by milking.

Trials of the scheme made at the Wisconsin and New York stations afforded a daily average increase per cow of a pound of milk and two ounces of butter. The "after-milk" was very rich in fat, testing about 10 per cent. This after-milking takes not to exceed five minutes' time—often less than this. The two ounces of butter may be held at a low estimate to be worth two cents. This would be a fair pay for five minutes' work, 24 cents an hour and the skimmilk thrown in. Not only is more milk and butter made, but the secretion is stimulated and the lactation period prolonged. Similar work at the Vermont station following a good and conscientious milker were much less effective.

It may be remarked, however, that the differences in milk and butter yields between this method and careful stripping are not great. This Danish method, however, does emphasize, more perhaps than has hitherto been done, the actual and potential losses due to incomplete milking.

## Cream Testing.

"What has science done for me?" asks the man who runs the separator.

Nothing perhaps to make his lot the easier, but something that may enable him to deliver better cream to the butter maker; for it has given him a more accurate means than he has hitherto possessed of detecting dirty milk, and of judging cream at the weigh can or on the cream route. This proposition is not a new one. It is nothing which the operator will be likely to adopt of his own initiative, for it spells turmoil to him; but some day it will come. A scheme of this kind seems more called for nowadays as a cream grader than as a milk detective. Infrequent deliveries or collections and inadequate attention given the cream at the farm make decided differences in actual butter values, differences which the Babcock cannot measure. The test is an easy one. A pink tablet of alkali dissolved in water is mixed with a small measure of cream. If the fluid remains pink the cream grades 1, being relatively sweet; if the pink hue fades out, the cream grades 2, being relatively less sweet. The two creams, for there will be many lots of each, may be ripened and churned separately and paid for on the basis of returns, or a definite and predetermined discount may be made for No. 2 cream. The system is in vogue in some creameries. It's an educator; also a trouble breeder. Keep thinking about it!

Perhaps our friend the separator operative thinks his machine takes out the bacteria. He may be excused for thinking so, for does not one of the largest of the separator companies so advertise? The solid impurities are thus largely removed, but not the bacteria, according to Iowa Station's trials in which roughly one-third of the bacteria appeared in the skimmilk, one-fourth in the cream and rather less than one-half in the separator slime. Neither was it found that the keeping qualities of either the cream or the skimmilk were at all bettered as a result. As a clarifier and cleaner in the tangible dirt, centrifugalizing milk is a success but the content of dissolved dirt and bacterial dirt in the milk are but little altered by centrifugalizing.

## Extra Butter.

What aid has been vouchsafed the butter maker in his endeavor to make extras?

1. Pasteurization for butter making has been popularized and made more practicable.
2. Dairy salts have been thoroughly investigated as to their purity, their mechanical properties and their comparative values.

Pasteurization has had vogue for several years. It is no new proposition, but there have been of late some points developed on which it is worth while laying some stress.

In the first place we recognize nowadays two sorts of pasteurization as employed with dairy products, one which is designed to destroy pathogenic or disease producing organisms and one which is aimed primarily at those which impair keeping qualities. The first of these is meant to be a completed operation, the second, an incompleted one. Each has, however, a distinct and definite purpose. Now it is only with the latter that the butter-maker has to do. His subjection of large volumes of milk or cream to the influence of relatively high temperatures for a short time in some one of the many continuous forms of pasteurizer improves but does not make perfect, gets rid of many but not of all the organisms. The more modern mechanisms seem calculated rather to lessen the labor and expense of handling a given volume of product than to insure the death of all of the "bugs." For the distinct purpose in view ,the enhancing of the keeping qualities of the butter, this is probably an evolution in the right direction.

A recent suggestion from a western dairy school seems pertinent. It is that the wash water should be pasteurized. It often happens—more often than not perhaps—that creamery water supplies are not as pure, bacteriologically, as they should be, What avails it for the buttermaker to pasteurize the cream and then wash the butter in a germ laden water? To be sure he is not quite as apt to get so large a variety of posies in his bouquet as if he used no effort to improve the situation, but their numbers may be very great. At any rate, experiments at the Iowa Station indicate that the keeping quality of the butter was enhanced when the water was pasteurized as well as the cream. Filtering the water through stone, sand, coke, charcoal and gravel also helps.

Dairy salt serves four purposes in butter and cheese making.

1. It aids in the expulsion of the buttermilk or whey.

2. It augments the keeping qualities of butter.

3. It serves to promote the ripening of cheese.

4. It accentuates flavor.

Nearly a million dollars' worth of dairy salt is used yearly, most of it of domestic origin. Good salt does much and poor salt does more to affect the grade of dairy products. How do the many sorts offered us serve us?

Salt is a combination of chlorin and sodium. But all salts are not all salt. Indeed, no salt is all salt, as each brand carries more or less impurity. The average American made dairy salt carries 98.3 per cent of true salt and 1.7 per cent of impurities, of which 0.2 per cent is moisture, 0.1 per cent magnesium chlorid, 0.3 per cent calcium chlorid, and 1.1 per cent calcium sulphate or gypsum. The magnesium and calcium chlorids possess a bitter taste. In the quantities ordinarily present they apparently exert no ill effects on fresh butter, but they do sometimes damage storage goods. They seem to incite a slow decomposition of the butter fat. The gypsum is not only undesirable as a diluent but because it tends to cause salt to cake. Other things being equal, a salt that is relatively free from these impurities is to be preferred. Other things may not be equal, however, for the size of the grain, its shape, its apparent specific gravity and its solubility are important factors. The finer the grain, the greater its weight in a given volume and the more ready its solubility. Thus in a series of trials of fine and coarse grained salts, the former owing to greater solubility passed more readily out of the butter during working and proved the less economical. An ideal butter salt should be pure white, of a uniform, thin, flaky grain of medium size, without ill odor, and be nearly free from the bitter salts and dirt. An ideal cheese salt may be similarly described save that the size of the grain may be larger. No one brand stands first in all these respects. "There are others" than the one you use.

## Cheese Improvement.

Wherein has cheese making practice been put upon a higher plane by scientific investigation?

1. The phenomena of the ripening processes are better understood.

2. Canned cheese, paraffined cheese and cheese prints have been developed.

The causes of the changes brought about in cheese by the process known as ripening have been in part determined within the past few years. Up to recent times hypotheses were plenty, but facts few. It was thought that bacteria ripened cheese, but the process seems more likely to be at best but in part bacterial. It is now deemed that the natural and inherent enzymes of the fresh milk,—galactase and its associates, —and the pepsin of the rennet extract, or the scale pepsin of the drug stores which is now used in lieu of rennet in some factories, are also important factors; that all three working together are probably the main ripening agents, but that the environment—particularly as regard temperature—of the ripening cheese more than any other one thing gives character to the final product.

A number of interesting points have been brought out of late which must needs be but barely referred to. The underlying reason for the hot iron test, the causes of slimy, slippery curd, of gassy or floating curds, and of "leakiness," the rationale of the quick ripening and the slow ripening cheese processes have been developed; and the relationships between temperature, moisture, varying amounts of rennet or salt, on the one hand, and flavor and texture on the other, have been determined and the causes thereof have been working out. In short the Wisconsin and New York Stations have done the cheese industry a mighty service in their abstruse, high technical work and have afforded excellent examples of the practicability of pure science.

Europeans eat cheese; Americans taste it. The consumption of cheese in this country is relatively small. It furnishes only 0.4 percent of total food, 1.6 percent of the total protein and 1.6 percent of the total fat of the average American diet. There are several good reasons for this situation. One of them is the small proportion of the cheese made in this country which is put up in convenient form. The bulk of it, probably 99 percent, is marketed in slices, cut by the pround from large cheeses, slices which fail to keep well owing to the large surface exposed to the air. A more convenient and attractive method of marketing cheese ought to increase its consumption. Canned cheese and print cheese are two recent contributions towards the solution of this problem.

Print cheese has been made for years at the Wisconsin Station. The ordinary cheddar curd is placed in a rectangular mold and printed by pressure. Any form and size of print may be used. The Wisconsin block contains 30 one-half pound prints each 2.5″x2.5″x2.5″, the entire blocks being roughly a foot square and 2.5″ thick. It seems practicable to handle this class of cheese in the horizontal press. The print blocks cure as readily as do ordinary cheddars, develop a good flavor and texture, and may, like butter prints, bear an identifying mark which will aid in sales. Such a cheese, if of good quality, ought to sell not only because of its novelty but on its merits.

Cheese may be canned as green curd and ripened nicely in the can. At the Oregon Station two and one-half, five and twenty-three pound cheeses have been thus made which are without rind or mold, which lose no weight in curing, which after ripening keep for months, which stand shipment across the Atlantic and back, or to China and back, and open upon return in perfect condition. The cans are thoroughly paraffined within, the cheddar curd after milling and salting is either filled and pounded in and then put in press, being sealed the next morning; or, else, the curd pressed in the usual manner, is the next day slipped into big cans made to fit and sealed up. Cheese thus canned needs no further attention save the maintenance of a low and fairly constant temperature of about 60° F. A high temperature or a variable one, particularly when the cheese is young, ruins it. Some of these canned cheeses are being made today from milk which has been inoculated with sundry aroma-producing organisms. The possibility and practicability of controlling the flavor of the ripened cheese as a result of the use of specific bacteria has been demonstrated. It looks as if in the near future special brands of canned cheeses of guaranteed quality, of specific and excellent aroma and flavor, in specially labelled cans, cheeses without rind, every bit edible, well ripened, of friable texture, in short, a delicate and superior product, will be offered to the retail consumer. It looks as if this might solve the family trade difficulty and promote the use of this valuable, digestible, concentrated and under-used food.

Cheese of the cheddar or stirred curd type, dipped in paraffin at temperatures from 180-250° F., for a moment, and allowed to drain a few seconds, is coated thus with an air-tight, impervious coating which lessens the loss of weight in ripening, prevents the growth of mold, improves its appearance, and lowers the proportion of rind from about 12 percent to 3 percent. So far as observed, this in no way interferes with the ripening process or deteriorates the flavor or texture of the cheese. This modification of the process seems particularly adapted to the cold cured goods which are to be the coming cheese.

## The Factory.

Has science done anything to make the factory manager's job more of a bed of roses?

Not that I am aware of. It has, however, added to his information. It has shown him the injustice which he is often doing his cream patrons in not weighing the cream samples prior to testing. It has indicated some of the errors that are resident in careless methods of sample taking and handling. It has, however, for his comfort, vouchsafed some explanation of the great variations which may naturally occur in milk and in cream from the same dairy,—explanations which no doubt do not always satisfy him whose test drops, but are notwithstanding fairly satisfactory explanations.

"What makes the milk test vary so?" is still a burning question, though less so than it used to be. I sometimes wonder whether it is because dairymen understand it better, or because they are hardened to it; whether more accurate sampling and testing and better informed operators and superior mechanisms have lessened the proportion of incorrect testing, or whether the judicious use of a lead pencil in the office "evens things up." I do not know; but this I do know that any intelligent farmer who wishes can own and run a Babcock and determine the truth for himself if he is careful and informed, but not unless he is careful and well informed.

## Market Milk.

May market milk be bettered by aught that science has done for dairying?

Yes, for now are better understood than of old:

1. The principles underlying stable ventilation and the causes of its failures.

2. The sources whence are derived the organisms which cause annoyance, loss of products or disease; also how to avoid the damage they do.

3. The dangers of "doping."

The topic of stable ventilation is one which is often ventilated. Since much animal disease is due to or its spread promoted by the housing of cows in ill ventilated stables, it is a dollar and cents proposition to try and better this condition. Too little oxygen and too much carbon dioxide; too little air, too much exhalation from lungs, skin, manure, etc.; these are conditions which augment the growth of disease germs and impair vitality. A cow needs hourly 3,542 and a horse 4,296 cubic feet of air, amounts which fill a space ten feet high, ten feet wide and 35 to 43 feet long. Theoretically perfect ventilation is neither practicable nor necessary; but the conditions may be better in many barns.

Every barn is a problem unto itself, because of differences in shape, in distribution of contents, in contour of land in its vicinity, in the relationship of its structure to the direction of prevailing winds, as well as in the number, location and character of animals, etc. However, some of the principles which have been worked out are suggestive and helpful. These are:

1. Entrance of the fresh air near the ceiling of the stable by an indirect line, or by conduit into the barn near the cow's mangers.

2. Removal of the foul air from points near floor or near ceiling, either exit to be available as needed.

3. As straight, tall and simple a stack (ventilator) as practicable; as few angles as may be in side shafts; no horizontal lines whatsoever. In fact a good ventilating shaft should be as near an approximation to the form of a chimney as is practicable; should be airtight, should rise high above the roof, be located as near the center of the stable as may be and should have a liberal cross section. It is a good notion to sheathe a metal ventilating flue with wood and to use building paper on a wooden one. A chilled chimney does not draw well; and the chilling of a barn ventilating flue seriously impairs its efficacy.

It has long been known that the fodder and the bedding, the exterior of the cow and her milker, the utensils and the dairy, were all sources of the bacterial contamination of milk. It has been taught until recently, however, that the cow herself, if healthy, was not guilty; that her milk as it was drawn from the udder was free from micro-organisms if the fore milk was rejected. This is now known to be not quite true. She does contribute a small quota to the general assemblage; and all the cleansing of barn, and dairy, and occupants will not avail here, for we cannot cleanse the inside of a cow's udder. But we may deter almost all of the bacteria from entering the milk after it leaves the udder.

There are three ways of fighting the bacteria in milk.

They may be kept out.

They may be killed out.

They may be caused to commit race suicide.

Exclusion, destruction, isolation! All good—but the best way and one not of necessity expensive is so far as may be to exclude them.

Now I do not mean again to rehearse the story of cleanliness in the dairy. It's an old story. and folks are tired of it. I do want, however, to say a word or two about the sanitary milk pail.

Much of the dirt which gets into milk tangible and intangible, visible and invisible, that which may be seen on the cheese cloth strainer, and that which dissolves and passes through—dandruff, hairs, flecks of dried manure, bacteria and the like—fall into the milk from above during the process of milking. Now straining milk through cheese cloth only removes a part of this material. The situation can be bettered to a marked degree, the keeping quality of the milk be enhanced, and the likelihood that the milk will make good butter be increased by attention to a few details that are neither costly in money or time, nor difficult to install.

1. Wipe udder and abdomen with a slightly damp cloth immediately before milking.

2. Provide milkers with clean clothes for use at milking time.

3. Fill the seams of dairy utensils with solder and use some form of the sanitary or dirt-excluding milking pails.

There are several forms of the latter. One is a covered pail with a 4″ funnel covered with wire gauze into which fits a loose ring whereby may be fastened in a few layers of cheese cloth. Another is a closed pail with a large opening covered with a wire mesh, cheesecloth and absorbent cotton. And still a third and very practical pail is one with a shoulder and a hood, or visor, which is otherwise open. According as this is held the amount of dirt entering the pail may be cut down from 60 to 90 percent.

If now after the bacteria have been thus excluded their growth and multiplication are checked by low temperatures, one may feel fairly certain that the milk will have a lease of life almost as great as that of a ton of coal during a cold wave.

Doped milk is one of the dangers of the market milk trade, one of its great temptations. What is science's latest say-so as to embalming processes?

Dr. Wiley of the U. S. Department of Agriculture has contributed the first piece of positive information we have had on this subject. Claims and counter claims have been made as to the harmlessness or harmfulness of chemical preservatives. He, however ,is in a fair way to settle the matter by direct experimentation with his "poison squad," a lot of young men of vigorous health to whom under careful restrictions and constant medical supervision the borax compounds, common preservatives, have been fed. Without going into details it may be remarked that it has now been amply proven that considerable quantities of borax or boracic acid are inimical to digestion and to health; that minor quantities are more or less so though at times, perhaps, not injurious to healthy adults. These preservatives are undoubtedly less dangerous than are the ptomaines which may form if the materials remain unpreserved, yet they do not form when care and cold are used. Science has put its seal of disapproval on the use of preservatives unless the existence thereof is advertised on the container of the goods.

I have taxed your patience for a long time, yet I have only outlined a few of the many relatively recent contributions of research to dairying. If you would know more of them, would study any phase of the subject, ask and I will gladly direct you to literature if I am acquainted with it.

Now with what exhibition of oratory and rhetoric shall I close? A preacher having talked long and prosily to a lot of children finally said: "Now, little folks, what more can I say to you and do for you?" A little lad in the front row piped up "Say amen and sit down." Amen means "so be it;" and so most heartily to everything scientific and practicable that makes for dairy advancement say I "Amen"—and sit down.

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Mr. President: The papers of Prof. Lane and Hills are now before us for discussion.

Gov. Hoard: I want to enumerate two other points that science has added for the protection of the dairyman within recent years, and those are the tuberculin test for tuberculosis which has come within the past fifteen years, and the air cure for milk fever. Whereas five years ago 95 per cent of all the cows taken with milk fever died, to-day 95 per cent survive. All this came through the earnest study of Dr. Bangs of Denmark that enables the farmer to-day to save his very best cows which formerly used to perish with almost unerring fatality.

President Armsby: I cannot quite resist the temptation to blow our own horn on the matter of tuberculosis. There may be some who do not know that the first herd tested in this country for tuberculosis was tested by Dr. Leonard Pearson, on a well known herd in Philadelphia, and the first comparative demonstration made by any experiment station in this country, so far as I know, was made by the station in the succeeding year.

Mr. Hills: There are more tuberclin tested cows in the state of Vermont than in any other two states in the Union.

Mr. Norton: If they wish to take up the discussion, I have three or four resolutions; also to make a report of the Committee on Nominations.

RESOLVED, That the Dairy Union of Pennsylvania wishes to record as its earnest conviction that the Dairy Division of the Department of Agriculture at Washington should be advanced to the dignity of a Bureau. The great value of the dairy production of the United States demands that such standing be given to this industry in the Department at Washington. We ask our representatives in congress to work for such a consummation.

Chairman: You have heard the resolution. What is your pleasure?

It was moved and seconded that the resolution be adopted. Unanimously carried.

RESOLVED, That the Dairy Union of this State desires to express its high appreciation of the work done by the National Dairy Union in its fight with the fraud Oleomargarine. We believe it to be the duty of every creamery man in our State to contribute financially to the support of the National Dairy Union. Let every dairy farmer in the State write his member of congress, as well as the U. S. Senator in support of this work.

Moved and seconded that the resolution be adopted. Carried.

RESOLVED, That the Pennsylvania Dairy Union hereby endorses the bill (H. R. 345) introduced in the House of Representatives by the Hon. H. C. Adams, of Wisconsin, to increase the national appropriation to the Agricultural experiment station, and requests the representatives of Pennsylvania in the Senate and House to use their best efforts to secure its passage.

RESOLVED, That the Secretary be instructed to send a copy of these resolutions to the Hon. H. C. Adams, to the Hon. James Wilson, Secretary of Agriculture, and to each senator and representative from Pennsylvania.

Moved and seconded that the resolution be adopted. Carried.

The Chairman of the Nominating Committee made the following report: President, H. E. Van Norman, State College, Pa.; Vice President, Thomas Sharpless, West Chester; Secretary. W. E. Perham, Niagara; Treasurer, M. E. Reeder, Muncy; Board of Directors; J. H. Reichert, Scranton; M. P. Shoemaker, Greensburg; H. W. Fallsington, Comfort; J. W. Detrich, West Chester, and Henry Palmer, Avondale.

It was moved and seconded that the Secretary cast the ballot of the Union for the candidates. Carried.

The Secretary thereupon reported that he had cast the ballot for the foregoing nominees, and declared them elected.

The Chairman: Is the Auditing Committee ready to report at this time?

The Chairman of the Auditing Committee: The Auditing Committee have made a careful audit of the accounts, and we find that up to this morning the receipts amounted to $263.70, and the disbursements, $261.07, leaving a balance in the hands of the Treasurer of $2.63.

It was moved and seconded the report be received and filed. Carried.

### Dairy Legislation.

Gov. Hoard: I am exceedingly interested in your success in legislation, and I hope you will not think I am conceited if I give you a little experience. A gentleman here says it is very difficult to get anything here in Pennsylvania for the farmer or dairyman. I say to you that you are to blame if that is the case. You can teach the politicians of Pennsylvania just the same lessons that have been taught them in other states in the nation. You have got votes enough in Pennsylvania to make your voice heard when you make your influence potent. When the National Dairy Union grappled with the proposition of passing certain legislation, and I happened to be president of that body, spending three years, nearly, in Washington, and over $1,500 of my own money, we had scarcely any funds to do business with, with which to cope with the $150,000,000 of capital and the large corporation pool in Washington. What did we do? Instead of moving on the politicians and upon members of congress by our own appeal, we spent a large portion of that fund in double postal cards, on one half we said in substance what we wanted to say on the other half in his own writing. I tell you ,we snowed Washington under with postal cards. We pursued the same course with such men in Wisconsin, men who thought their constituency could not be rallied against them. I want to tell you we made those men get down off their high horses, and do business very quickly. It is astonishing what a few letters and postal cards and a few direct appeals to men in legislation will have. Resolutions may be resolved until the cows come home. You may resolute and resolute, and petitions may be circulated, and the average legislator with some other influence behind him will turn a contemptuous nose on the whole proposition, but a direct letter from one of his own district, or a postal card, a clear straightforward statement that we want so and so, and if we do not have so and so, we will hold it in remembrance, has a great deal to do, and has a most potent effect. I advise you dairymen all over the state of Pennsylvania to become enthused with this idea.

President Armsby: I might say for the information of our friends from other states that this personal appeal through letters to members of the legislature has thus far brought a total appropriation for agricultural and educational work of a little over $200,000. Personal letters did it, and will do it every time.

The Chairman: If there is no further business a motion to adjourn is in order.

Motion made to adjourn until 7.30 this evening, when a joint session will be held with the Pennsylvania Live Stock Breeders' Association will be held.

Motion carried.

# EVENING SESSION

## Joint Session of Pennsylvania Live Stock Breeders' Association and Pennsylvania Dairy Union.

Meeting called to order at 7.30 by President Armsby.

The Chairman: Is there any unfinished business to be taken up?

Mr. Reichert: I believe, Mr. Chairman, some of us who have attended meetings in recent years feel that some one is deserving of a great deal of credit for the splendid turnout we have here to-day, and I feel that a vote of thanks is due Mr. Bayard of the National Stockman as the person who deserves the greatest credit. I desire to make a motion that a vote of thanks of the Association be tendered Mr. Bayard.

Motion seconded and unanimously carried.

President Armsby: I want to add my personal thanks to Mr. Bayard for the very cordial and generous way in which he has relieved the officers of the Dairy Union of the duties which properly belong to them, and of the efficiency of the arrangements that we have had for this meeting. Those in favor of this vote of thanks say aye. Unanimously carried. (Applause.)

Mr. Norton: I think there should be a committee of three appointed in reference to the Grout bill, and therefore I make a motion to that effect that this committee, to be appointed by the Chair, to consult with other allied organizations, and to take up this question of the fight of the Grout bill. I leave the appointment of the Committee with the Chairman.

Motion seconded and unanimously carried.

Prof. Van Norman: I have just had a talk with some of the gentlemen in regard to state appropriations. I want to ask whether the matter is in the President's hands, or in the hands of the board of directors, or whether any action should be taken here instructing them to look after that in the future.

President Armsby: The directors represent the Union between meetings. It is perfectly proper for the meeting to instruct the board of directors.

Mr. Norton: I think the board of directors are supposed to look after the interests of the Dairy Union and I should think that would come under the head of looking after these interests. I do not believe that needs a special committee, but if they want the endorsement of the meeting, whether to go ahead and do that, I do not believe there is a man in this room but who is in favor of their asking for the appropriation at the next session of the legislature.

The Chairman: We will now listen to the Hon. N. B. Critchfield, Secretary of Agriculture, who will give us a short talk.

## REMARKS OF SECRETARY CRITCHFIELD

Mr. Chairman, and gentlemen of this Union meeting: I went to a great deal of trouble to get here this evening. I have been very busy for the last few days, and it was quite an undertaking for me to get here at all, but I wanted to come, if I could only be present at this joint session, and in order that by my presence I might be able to assure you of the personal interest that I feel in the work you are doing, and the interest that the Department of Agriculture of the State of Pennsylvania feels in what you are doing, what both these organizations are doing for the agriculture of the Commonwealth of Pennsylvania. There is another reason, Mr. Chairman, why I was especially anxious to be here to-night, and that was in order that I might have the pleasure of meeting, and not only meeting but hearing, the distinguished gentlemen whom you have brought here from other states. So I say it is a pleasure to me to be here.

The work that you are doing in both these associations is very nearly related to the work that is being done by the Department of Agriculture of the state, and especially is that true just now. You are engaged in the improvement of the dairy interests of the state as well as the live stock of our commonwealth, and our department has been engaged, for the last few weeks especially, in the work of trying to provide better feed upon which the live stock of the commonwealth shall subsist. You may know something of what we are doing if I tell you that since I left the state capital on Monday evening I have attended no less than fifteen hearings, that resulted from prosecutions brought against persons for a violation of our feeding stuffs law. This work of prosecution was delayed for a while for the reason, for two reasons, I may say; 1st, because we did not feel like entering upon it until we had our chemical laboratory thoroughly established, and well equipped at the state capital, so that there might be constant intercourse between our chemist and the head of the department; and second, for the reason that some changes were made in our feeding stuffs law by the late legislature, and it was thought proper to give the people an opportunity to obtain a knowledge of the law. The application of the term commercial feed stuff by the last amendment was extended, and liabilities of dealers were increased considerably. In order that some people might have some knowledge of the law before prosecutions were begun we determined to wait until three months had elapsed, and during those three months we were trying to inform the manufacturers and dealers throughout the state of Pennsylvania what the requirements of the law are. Printed copies of the law and the amendment thereto were sent out to all the dealers whose addresses we could secure, and circulars explaining the law were sent to all the newspapers of the commonwealth with the request that they be published for the information of the people, and it was determined that prosecutions should begin, in fact, Mr. Chairman, we hoped by publicity perhaps we could do away with the necessity of any prosecutions, but we determined if giving publicity to this matter would not do away with the necessity of prosecutions, they should be begun soon after the first of August, and we would begin to prosecute wherever we found violations of the law by dealers from whom samples were taken in the first of August and afterwards. And we have had quite a number of them to bring, so we have been very busy, and in this work I say we are working especially along the same lines that you are working.

Now, I did not expect to make a speech when I came here. In fact, I am not a speech maker, but before leaving the floor I want to congratulate the members of the State Live Stock Breeders' Association and members of the Dairy Union upon the excellent prospects that seem to be before you. I do not know that there was ever a time when prospects for the men engaged in rearing live stock, and especially breeding the better class of live stock, were better than at the present time, and you know the market, the market price for dairy products, has been holding up remarkably well during the past year. There has never been a time since the creation of the Department of Agriculture when there was such a very great demand for licenses to manufacture and sell oleomargarine and renovated butter as there has been within the last few weeks. Now, we do not care about seeing very much of this stuff manufactured or placed upon the market, but our law provides it shall be done if it is done according to the laws of the commonwealth under a license that is granted by the Department of Agriculture, and the reason why I mention this is an indication that the price of dairy products is holding up well. The people who manufacture these imitations of dairy products, of the genuine article that is manufactured at the creamery and upon the farm, are wide awake people, and they would not be asking for a license to engage in this business unless they felt there was a very good prospect before them.

With regard to the live stock interests, it seems to me that the prospects for the future are very flattering indeed. The year just closed has been one of the best years that I have known during the period since the time immediately after the Civil war. The live stock sold in the city of Chicago, and what is done in the city of Chicago, by the way, is a very good index to what is done throughout the whole country so far as the live stock is concerned, the live stock that were sold in the city of Chicago during the last year were sold for $36,400,000 more than was received for live stock during the year preceding. That is certainly a very large increase. The demand for horses, especially, has been remarkably good during the last year. Those of you who have been watching the market have not failed to see that good driving horses, horses well mated, well bred, well trained, that have good style and good action, have been selling readily from eight to twelve hundred dollars per pair, and the same improvement is true of heavy draft horses. So that those of you who are engaged in raising horses have a very excellent prospect before you. And the same is true of the cattle trade. You have noticed, perhaps, as I have noticed, there is an inclination in recent years towards the purchase in our market of what is called baby beef, cattle being slaughtered younger than they used to be, and this perhaps is owing to the fact that we have a large population in our cities who want a good home dressed beef that is reasonably tender, without knowing that it has been placed in cold storage and ripened for two or three months before it has been placed upon the market. This, no doubt, is one reason why we have this demand. Another reason, perhaps, is found in the fact that they have come to understand better than they have done in the past, that the most money is made in feeding stock, by getting it into the market just as early as possible. The young animals are growing, you know, much more rapidly, and much more weight can be made with the same amount of feed given to a young animal than given to one that is older. You take, for example, a calf that weighs 100 pounds at the beginning by careful attention and proper feeding the weight can be increased from eight to ten hundred pounds the first year. Every one knows if that calf goes beyond 400 pounds in the increase in weight of the animal for the second year, it is doing very well. We all know that much larger amount of feed is consumed the second year than the first year. The older the animal gets, until the period of growth is ended, the less will be the increase in weight, and after the growth of the animal has been completed the gain will be still less. So the feeders have come to understand that if they want to get a good price they must get their stock into the market just as early as possible.

Now, the point to which I wish to come is, that these ends can be secured only by having the best stock to begin with, the best blood, and hence I say there is a very bright prospect in the near future for those of you who are engaged in breeding, in producing the very best stock for breeding purposes.

Now, Mr. Chairman, as I said at the outset, I do not expect to take much of your time. I know that you have your programme and that every moment of your time is precious. But it has afforded me great pleasure to look in upon you, even though it be for this one session only. I must return tomorrow to the work at which I have been engaged, attending hearings in other parts of the state, so that I only hope to be with you at this session, but I am very glad indeed to have been here, and it has been an inspiration to me, it is an inspiration to me, to look into your faces and to see men such as I see before me, earnestly engaged in the work in which you are engaged. I will return to the work of the department better qualified for that work because I have had the opportunity of meeting with you here. I thank you for your attention. (Applause.)

The Chairman: There can be nothing more important I am sure to have all the various agencies for the promotion of agriculture in our commonwealth working in harmony, and it is especially gratifying therefore to hear these words of inspiration and sympathy from the Secretary of Agriculture.

The Chairman will announce as the Committee on the Grout act to confer with similar committees. W. C. Norton, Thomas Sharpless, M. P. Shoemaker.

Now, gentlemen, I will ask the President of the Breeders' Association, Mr. W. C. Norton, to take the chair for the remainder of the evening.

President Norton: The first thing on the program will be an address on "Alfalfa in the East," by Willis O. Wing, of Ohio.

# ALFALFA IN THE EAST

**Willis O. Wing, Mechanicsburg, O.**

Mr. Chairman, and Gentlemen: It gives me great pleasure, and I feel it is one of the great honors that has happened to me, to talk to a body of men like this. I have attended a few meetings, and I do not think I ever looked into the faces of as able a lot of men. I want to say right now, gentlemen, that I am not a speaker. My brother is the speaker. I have just come down here to tell you a few truths about the alfalfa plant. I will try to confine myself to the truth, and maybe if you do not get a literary treat you will get some real good out of it.

Gentlemen, if you went into a field of clover and you knew that it represented eight tons to the acre; if when you got through cutting your oats and piling the sheaves, you knew that it represented 160 bushels to the acre; if when you looked at that field of corn, you knew that it represented 120 bushels—as we speak of bushels in Ohio—if you approached crops like that, that meant that amount of wealth, and it had been established by the traditions of your state and your farm, when you approach a crop like that, then what would your feelings be? Gentlemen, that is the sort of crop I have to present to you in the crops of alfalfa. Now, those sound like strong figures, but let me make that a little clearer. We raised there at home on our land about four tons average per acre on about a hundred acres. We raise no better than our neighbors, not as good as some a little ways off from us. We are able to trade this alfalfa very nearly pound for pound for ear corn. Figure for yourselves, and see how much corn I can buy with an acre of alfalfa. I can buy just about two acres of 60 bushel corn as we speak of corn. You may say that this alfalfa is a new crop, that it may have this value now, because we have been able to dupe some people into buying it. But I want to say to you that alfalfa has an intrinsic value. I have heard it said of spring barley that it is meant to sell and to start alfalfa with. Alfalfa I would say has an intrinsic value. I will show you it has an intrinsic value when I come to measure it. I was talking with a man this morning who raised this year probably 200 tons of this hay. I asked why he didn't sell it and buy some clover to put in the place of it. He said, "No, I wouldn't care to do that. I wouldn't make anything by it." I don't know of any fellow who is a closer figurer than your hired hand. One of my neighbors recently had a hand. He said to him, "If you want some hay, I have some clover hay which you can have at $6 a ton, and I have got some alfalfa which you can have for $12 a ton." The hand said, "You don't fool me, I will take the alfalfa." He would have been inclined to take the clover if he hadn't thought he was going to get a little more than twice the value. I wouldn't let a man bring to me two tons of clover and take away a ton of fine alfalfa hay for a fattening ration.

Now, if you will look at the values according to the analysis, they wouldn't be in that ratio, but in a fattening ration I want to call your attention to one thing. A food that has $4 worth of food value to the ton to my notion would not be worth much more than half as much as a food that had $6 worth a ton. I don't know, it may be a little bewildering for me to present that in that way, but now, for instance, alfalfa is given at about $9 when clover is worth about $6. But in a fattening ration I don't believe that will work out. As a maintenance ration, I think that perhaps it might if they are equally good. The point I am trying to make is the ration of lower value burdens the animal. For instance, corn fodder would show an amount of food value probably say three dollars a ton, but you could not fatten an animal if you were to give him ever so many tons of corn fodder. You could not give him enough pounds. I think you get my point.

Alfalfa has a fertilizing value. It has a mechanical value as a sub-soiler. The roots go way down there, maybe six, eight, ten or twelve feet. I have seen them five feet the first year's growth. When it is plowed it leaves that soil with little capillaries running down. It has a value in that it adds some organic matter as the clover root does. It has a value as a nitrogen gatherer with all of the other leguminous plants. I suppose that from an acre of alfalfa, from what the dean over at the university said the other day, if you fed the stuff back on to the land, and would add to that the nitrogen of the air that you get from an acre of it, you would put on to that soil about $25 worth, taking it at the price at which you buy nitrogen. We have fed this hay to lambs. We fed 1,400 lambs and 100 head of fine sheep at home. I will say to those of you who are lamb feeders I have been able to double the weight of the lambs in a period of six months' feeding about two bushels of corn, and what alfalfa hay they would consume, and when I say consume I mean practically all of it, because we throw out nothing from the racks but some stalks.

Now, then, I come to the question whether alfalfa can be grown in Pennsylvania. I want to say for your encouragement that some who have tried it in Ohio failed. One of the men over there who tried it was at the college one time, another was at the State Experiment station, and all the agricultural papers and lots of our neighbors said, "Well, now, you can't just grow it. That is all there is to it. You might just as well shut up. You can't grow it here." They said it wasn't the natural place for the plant. But we are growing, within a radius of fifteen miles of our home, a matter of three thousand tons this last year. We fooled with alfalfa for a matter of ten years, and were very much discouraged, and I want to say to you, you find out one thing if you have ever tried it on a piece of ground and did not succeed and plow that up and re-seed it, you will find it succeed much better than the first time. That is practically on account of three things, one of which, there is something in inoculation, and there is added some fertility; and further, it has put the ground in better mechanical condition for the following crops. Now, then, I would say to you that where we are growing it in Ohio we are growing it on a variety of soils in the glacial drift—I don't know that the glacial drift has any peculiar significance—but we are in the glacial drift, and we thought at first it was best on alluvial soils, and tried it on alluvial soils; and then we thought we could do better on gravelly soils, and we have finally come to grow the best alfalfa on heavy white clay lands, and on yellow clay lands, lands that were formerly considered pretty poor lands. But there is where it is doing the best to-day since we have got stands of it. You cannot grow alfalfa, to begin with, on a shallow soil, that is a soil where it is only twelve or fifteen inches to the bed rock, in our country, for the reason that it will freeze out in February and March, it will heave out of the ground, but there are not, I suppose, very many soils like that in your state. Mostly you would have a depth of from three to eight feet. We grow it on even pea soils there at home with the addition of some muriate of potash. My brother told me that the keystone of the situation in Pennsylvania is lime. I do not know that it is, but if you put lime on I wouldn't fool with it, I would put enough on. It is not very expensive, and put on about 300 pounds to the acre, and put it on in almost any form.

Now, then, to come right down to alfalfa. To grow alfalfa in any state there are two or three things that are necessary, and one is a dry soil. To grow alfalfa successfully on my farm we had to put in 320 acres about 14 miles of tile drain. That is a synonymous term for sweet soil, and it is not sweet everywhere. You must have a sweet soil, and the lime will make it sweet if it is acid. Last, but not least, you must have some humus in that soil, and preferably some manure on the land. Now, I do not mean by that you must always have a rich soil. We have alfalfa growing finely on land that was just a white pipe stem clay, but we stimulated it. First we coated with manure, we stimulated the plant until the roots get down to the subsoil.

A Member: How long do they stay on that soil?

Mr. Wing: Twelve years. That is, possibly getting better up until about the eighth year. Now, then, about our process of seeding. We plow the ground early in the spring, or late in the winter if we can, and plow it a little deep so it will turn up some fresh dirt. Then early in the spring as we can work the land we go in there and seed the ground nicely with seed, about 15 pounds of alfalfa seed, and about a bushel of beardless spring barley. That is what it is useful for, to give a stand of alfalfa, and it is the best nurse crop.

A Member: Why not any barley?

Mr. Wing: I am not acquainted with other barleys, but this beardless spring barley is short strawed, early maturing, beardless, matures with wheat. The other method would be to seed without a nurse crop, except if you are pestered with crab grass. Do you know anything about crab grass in this state?

A Member: Yes, have some in the eastern part of the state.

Mr. Wing: Where you are bothered with that plow as suggested early, and disc along until say June or July even, and then seed at the rate of fifteen pounds per acre by itself, or if you had a season like this season, I wouldn't see why you couldn't plow up a clover field or oats stubble and seed after those crops. Whether you seed with a nurse crop or without it will be necessary the first year to clip the weeds off if the weeds appear. Rake them off. The first year it won't look like it is going to amount to anything. When the fall of the year comes around do not be tempted to pasture it the first fall. Let it have all its growth, it will be much stronger, go through right the next winter and next year the hay will pay you for keeping the stock off that first year.

Another word about seeding. In selecting your seed, darker seed is an indication that the seed is heated in the stack or after it is thrashed or some time. Select the bright yellow seed and if a few green seed should appear in it that does not hurt. It merely signifies that the seed has been grown in the northwestern rather than in the southwestern part of the country, and the notion is the northwestern seed should be the better seed. I do not think you will notice any difference, but it is just as well to be on the safe side.

I have got conceit enough to think I can come here into Pennsylvania and raise alfalfa. I may be wrong. Now, I just want to tell you a little bit of what alfalfa has done there at our place. About fifteen years ago the gross receipts of our farm were $800. When we started to feeding lambs we were able to fatten there about a single deck load. Then we got a double deck load, or about 250. After we fed the 250 we carefully saved all that manure and put it back on the place. This winter we are feeding 1,400 lambs and a hundred head of fine sheep, and cows and horses that go with the place, on the same amount of land that fifteen years ago produced a net revenue of $800. In addition we have sold 150 tons of hay off the place. If you desire to ask any questions I will gladly answer such as I may be able.

A Member: Can you tell us anything about alfalfa meal, manufactured as concentrated meal?

Mr. Wing: I cannot tell you anything you probably do not know now about alfalfa meal.

A Member: You say your lambs doubled in weight?

Mr. Wing: Yes.

A Member: How heavy are they when you get them?

Mr. Wing: From 42 to 52 pounds.

A Member: Have you had any experience with the so-called alfalfa culture?

Mr. Wing: We believe in inoculation. But it does not sound reasonable to me, gentlemen, that if you had a piece of land with all the life out of it that you could inoculate that soil and expect the bacteria to live. What is the best place to make them thrive? Disease bacteria thrive where there is some filth, and I believe that if you would thoroughly manure the land where you intend to raise alfalfa the bacteria will ultimately take care of the situation. You will introduce a few with the seed. However, if you want to inoculate that soil, I do not think you can hurt it at all. I believe that you would get pretty close to the same result without inoculation if your soil had been manured. Where it was manured I never failed to find them almost at once, and quantities of them.

A Member: Did you ever inoculate the soil by introducing soil from other fields?

Mr. Wing: No sir, when we commenced growing it out there at the farm there was not much said about inoculation. I think if we had known more about it at that time perhaps we might have been benefited somewhat, but we didn't have the amount of stable manure then that we have now; nor did we realize the importance of it.

A Member: How many crops do you usually aim to get without plowing up and reseeding?

Mr. Wing: I am trying now to get the farm into a systematic shape. I follow corn with corn. This year I got 72 bushels of corn (144 measured) on the alfalfa side, and 68 bushels on the old ground. So it is two years in corn, and then a year in barley and alfalfa, and then three years more in straight alfalfa. This makes a six-year rotation.

A Member: Do you cure your hay under caps?

Mr. Wing: No, sir, we haven't got that far yet.

A Member: Tell us how you harvest it.

Mr. Wing: It is pretty hard to describe. The weather enters into it so much, the conditions vary so ,but I prefer to make it mainly in the swath, that is the first crop. But you might have to let it lie a couple of days if you are having bad weather, and just as soon as it gets dry for half way down, start the rake in there and rake it into small winrows and turn the green side up. When that green side is dried properly, get it into the shock. Putting it into shock depends upon the weather. Sometimes be ten days or two weeks before we get it into the barn.

A Member: You mean let it wilt and pile it up?

Mr. Wing: After you come to throw it out it seems like it gets in a sweat and loses moisture very rapidly. On the second and third days it is a different proposition, about such a proposition as to make clover. We don't use a tedder for the reason that the leaves come off very readily. I believe there is a form of tedder that won't do that, but the old fashioned kicker that we had would knock the leaves off.

A Member: Do the roots bother the tile drains?

Mr. Wing: Yes, if you get tile running through your field, that is a field with running water throughout the entire growing season, it will be better to leave that strip of ground over the tile without any alfalfa. We had a hundred yards of tile filled. We have about 14 miles of tile there on that farm, and that is all the tile that has ever been bothered, but most of them during the summer months are empty.

A Member: Would you advise paying $20 a ton for the alfalfa meal?

Mr. Wing: No, I do not believe I would. What would you want to use it for?

A Member: Feeding dairy cows.

Mr. Wing: I do not believe there would be any advantage to dairy cattle to have it ground. Your dairy cattle will eat it all.

A Member: It is not on the market in any other form.

Mr. Wing: No, sir, unfortunately it is not on the market very much yet, but it will be. I believe that Ohio is going to raise a lot of alfalfa hay.

A Member: Would you pay $20 for it if bran was the same price? And if the alfalfa were put in the same mechanical condition that the bran is in, would it, in your mind, be a substitute for bran?

Mr. Wing: Yes, I would not hesitate to say that alfalfa will make a substitute for bran. I will tell you what I base my assumption on. One or two years we fed lambs on shredded fodder or with clover hay and bought bran, and my bran bill was something huge. I gave them what bran they would consume. Also I have had quite a little experience feeding bran to our fine sheep, and we just about get our bran bill out, and my gains with alfalfa and no bran are as good to-day as they were ever, I don't know but a little better.

A Member: The advantage of grinding the alfalfa is to put it into the same mechanical condition that bran is in, and to save the cow that work.

Mr. Wing: The cow hasn't anything else to do. I would think it would be cheaper to buy the hay.

A Member: If you could get hay and bran at say $20 a ton and ground alfalfa at $20 a ton also, which would you take?

Mr. Wing: Well, that would depend a little on the kind of alfalfa that was ground. If it was damaged alfalfa I would prefer the bran.

A Member: Supposing it was first class.

Mr. Wing: According to analyses there is not very much difference, and according to my own experience in feeding there has not been a great deal of difference.

A Member: You mean alfalfa hay ground up?

Mr. Wing: Yes.

A Member: Nearly equal the wheat bran?

Mr. Wing: Yes.

A Member: Is that the whole stalk or only the top that is ground?

Mr. Wing: The entire plant. My lambs do not discriminate about stalk as they do about the clover. I will give you an illustration of the value of alfalfa. We have some clover this year on some land that we bought that we thought was not rich enough to raise alfalfa on, and we had been feeding that clover to one bunch of lambs; two other bunches of lambs were fed on some very badly damaged alfalfa. We had a great deal of rain at the time of the first batch of hay last season, and the alfalfa stood there in shocks until when I went to open it out it smelled, and there were traces of mildew in it, and it looked like manure when it was wet and soppy. I felt pretty blue. We had probably 45 or 50 acres of hay in that condition. But we opened it out and got it dry, and it looked better ,and I put the best of it in the barn and the worst of it in the rack. I have been feeding some of the worst of that hay to one bunch of lambs, and some pretty good clover to another bunch up to the first of the year. With the clover-fed lambs I had my brother feed all of the corn they would take in the ten weeks, and now, we didn't weigh these lambs when we put them in the feeding, but if you know the western lambs you will know they run uniform. The alfalfa-fed lambs were about 5 pounds heavier than the other lambs that had all the corn they would consume.

A Member: Without corn?

Mr. Wing: Without corn and with damaged alfalfa. That on my bunch of lambs means over $500 if it had been fed throughout. They ate that damaged alfalfa almost all of it, threw out very little. And with alfalfa hay, as we ordinarily raise it, we do not throw out anything and make good gains. I think any of you will concede that.

A Member: Do you know how much a lamb gained in the ten weeks?

Mr. Wing: Well, in the ten weeks they gained one bunch about five pounds I assume, and the other ten pounds. The first period, you know, frequently up until Christmas, we do not expect to get much if any gain at all. We get the weak western lambs, and then after that period you begin to get the gains, after they get a good start.

A Member: Starting an alfalfa field in Pennsylvania the first year seems to be a general failure. Would you put it right back on the same ground and inoculate?

Mr. Wing: Let me give you another suggestion. I have talked to a number of you. Why don't you mix your clover and alfalfa say half and half for a year or so? That will help to inoculate and there would be something to do, and they don't quarrel at all.

A Member: Do you use commercial fertilizer?

Mr. Wing: No, haven't used over 4 tons in fifteen years on the farm.

A Member: Do you use common clover as a nurse crop?

Mr. Wing: No, I wouldn't. For a nurse crop I said we had barley the first year, and seeded without a nurse crop along later in the summer after discing the land.

A Member: Do you sow on a wheat field?

Mr. Wing: We sow every way. You can sow on a field such as a wheat field and your land should be plowed preferably, and it must be disced. The seed must be put in the ground.

A Member: How do you sow it?

Mr. Wing: We ordinarily sow with a drill and let it go in front of the drill hoes. Just put it in the grass department and let it go in front of the drill hoes so it will become covered slightly.

A Member: Do you pasture?

Mr. Wing: Yes, we pasture it with all kinds of stock. There is a little danger in pasturing cattle or sheep. It may be done, but I think here in Pennsylvania you would be safer to soil with the cattle and sheep. They are pretty valuable here. With hogs or with horses there is no danger. I wouldn't pasture at this stage very much while you have the difficulty you now have in starting it, because the tramping of the ground is not good for it. It will not do at all. I believe I wouldn't pasture very much until you get a better stand.

A Member: Do you allow the nurse crop of barley to get ripe?

Mr. Wing: Yes. Sometimes sow oats and cut that for hay, but oat hay is one of the hardest kinds of hay I know of to cure; it is likely to be neglected and if it goes too long it will not do right. I believe I would just use that barley first, or else cut out the nurse crop.

## Alfalfa in Wisconsin.

Gov. Hoard: Gentlemen—This alfalfa question is a great big one. I have been growing alfalfa in Wisconsin for ten years. Indeed it might be said like Mr. Wing that I was the pioneer of it in that state. It had been tried in a fugitive way here and there by men who said it could not be grown. I found on a farm that was near me roots that were thirty years old. I thought that would answer sufficiently. I believed I could grow alfalfa if I knew enough about it. I readily saw that in that climate it had to be handled with peculiar understanding. For instance we get the mercury 40 degrees below zero. I took about 25 or 30 city lots, varying in all kinds of soil from a blue clay residium sub-soil, black soil, up to sandy soil. Heavy clay, clay 30 feet deep, tried all kinds of soil, and had a great many failures, and welcomed every failure as much as I would a success, because it taught me as much, and I finally succeeded in formulating a method which I want to say has proved eminently successful. Prof. Henry at our experiment station said, "Hoard, I don't think you can succeed." The whole of the agricultural college thought I couldn't do it, but I did it. The result of it is I put 180 tons in my barns last year ,from 35 acres of land.

Now, a few things about what I do with it. For instance I was feeding ordinary hay to my herds of Guernsey cattle and eight to ten pounds of Ajax flakes and bran with 35 pounds of good field corn ensilage that would go from 90 to 100 baskets to the acre. When I put my cows upon alfalfa hay, ten to twelve pounds, they continued in that way for two weeks. They increased their milk flow and I put the manure under a magnifying glass and I made up my mind I was throwing away grain. I reduced the grain ration, and the milk flow held; and I reduced it until I cut the grain ration squarely in two, and it saved me 50 per cent of my grain ration. It is worth that much in making milk. So that 35 pounds of good field corn ensilage with the corn in, and ten to twelve pounds of alfalfa hay, particularly if it was the second and third cutting, will almost complete the ration, needing say about 3 pounds of bran and a pound of gluten or three pounds of bran and two pounds of ground barley to the cow. Now, those cows did this last year. The whole herd averaged, and they were not fed any more than from the 15th of May until the 15th of October, they averaged 6,750 pounds of milk, and made within a fraction of 400 pounds of butter per cow. That was the result of feeding 35 pounds of ensilage and 10 to 12 pounds of alfalfa hay, and the ration of grain I told. It cost $32.60 per cow and the $6 a year for the pasturage.

## For Horses.

Another thing I do with alfalfa. I have three field teams of horses. I fed the alfalfa hay, first cutting, just the coarsest, for the winter keeping of my horses on eight ears of corn a day. My horses are fat on 12 pounds of alfalfa and eight ears of corn a day. So much for horses. My brood sows from the time they are served until the time they farrow are fed on nothing but their drink and alfalfa hay. A party of gentlemen from the University on Saturday last came over from the classes and they said to me that they had heard that I kept my brood sows on alfalfa hay during the period of gestation, and I said yes. "Well, we would like to see the hogs." I took them into the hog pen and showed them the sows. And they looked at me in blank amazement. "Why," they said, "these hogs are in good condition." "Yes." "And they get nothing but alfalfa hay? "That is all the nutriment they get except their drink."

A Member: Was that hay cut?

Gov. Hoard: Yes, sir, second and third cuttings.

A Member: What kind of drink do you give them?

Gov. Hoard: Their drink is mostly water, no whiskey I assure you. It is rarely ever they get milk—28 calves taking the skim milk. But you will be perfectly amazed, you can keep hogs all winter on nothing but hay and what water they need.

A Member: Do you cut the hay? Steam it?

Gov. Hoard: Io, I don't cut the hay, only cut it in the fall.

A Member: Do not chop it?

Gov. Hoard: I steam it, throw it into those hogs; as the old Irishman says, "Indade, man, but they ate it like a baste."

## Hogs and Alfalfa.

Now, this is what led me to do that thing. I ran across a bunch of hogs in Colorado that weighed 178 pounds per hog when they were eleven months old. After they were born they staid with the mother five weeks; then they were turned on to alfalfa pasture, and the little things, as they were, went to grazing on alfalfa. They were wintered on alfalfa, and sold when eleven months old weighing 178 pounds apiece, never saw a spoonful of grain in their lives. They were wintered at an alfalfa hay stack. I said to myself, there is something in this thing. In the west we had a great deal of trouble with our sows. In farrowing the pigs would come weak, lose a good many pigs, and we grow an abundance of corn there, and do you know, corn is one of the most deluding and debauching things in the world. Well, now, then, I reasoned that the difficulty with these pigs is that the mothers did not get protein enough to make those little bodies during the period of gestation, and the result of it was that when they came they were deficient in strength and vigor. The first time I tried this system of feed in the brood sows on alfalfa hay was five years ago. My foreman, when I went to Texas—to El Paso to spend two or three months—the foreman was just frantic about it and he says, "I hate to let you go off with such an order that I cannot feed those hogs any grain." "Well, now," I says, "I am going to stick right to it. I don't want you to feed them a spoonful. I don't care if I lose the hogs, I want to know about it." "Well," he says, "they will be perfect skeletons, I know it." A month rolled by and he wrote me "The hogs are not losing in weight." The next month came by and he says, "I think the hogs are gaining a little." I was suspicious. I wrote back to him, "Are you feeding any grain?" "Not a spoonful. I was stuck to what you told me." The pigs came and nine brood sows brought me 78 pigs, 75 of them I saved. The same sows farrowed again in the fall and having been fed on alfalfa during the summer they brought me 54 pigs. Three of them were lost by being laid upon, and not a weakling in the lot. And from that time on I have never had a single weakling pig where the sows ate alfalfa and were kept on alfalfa during the period of gestation. It is one of the most wonderful plants I have had any experience with. We found that the old monks a hundred years ago at Pueblo planted alfalfa and I have seen the roots which the people say were from the same old roots that were planted by the monks, and still it is just dawning on the intelligence of you and me. This plant called alfalfa was known to the old Germans under the name of Lucerne. They abandoned it when they came to this country. In Jefferson county where I live eighty per cent of the people are German. I got hold of an old German one day and asked him if he knew anything about alfalfa in the old country. He said they did not. I asked them if they did not know about Lucerne? "Sure, we know about Lucerne." I asked them if they ever grew it in the old country and some of the old men said they had grown plenty of it. I asked them why they didn't grow it here, and they said it wouldn't do here. And they simply expected it wouldn't and did not try it. Now, in Wisconsin to-day there are 800 young men belonging to the short course association, 800 men in Wisconsin scattered all over the state engaged in the special study of alfalfa. Think what that means to the 800 communities of Wisconsin. More than that, in Jefferson county at the present time there are something in the neighborhood of 2,500 acres. This spring the dealers tell me there are orders for seed already booked indicating a sowing of between three and four thousand acres, and that in this depressing season. A gentleman sowed 50 acres, a neighbor of mine. It was very thin poor soil. He had a poor crop last year, about two and a half tons to the acre. He sold the crop for a thousand dollars, $12 a ton. It cost him $1.20 to bale it, and he sold it to the alfalfa mill grinding company at Elgin, and he sold two car loads to the gentleman who owns the famous Guernsey cow that made 1013 pounds of butter last year. He sold another car to a gentleman at Duluth. I could have sold 500 carloads of alfalfa this year if I had had it, at $12 a ton on board cars. But I did not want to spare it, with the stock I have, about 80 Guernseys. I am a good deal like the old Pennsylvania Dutchman, "I don't know God Almighty how He feels towards me another year."

## Methods of Seeding.

A Member: Do you grow the seed?

Gov. Hoard: I have been trying to grow the seed, but have been unable to do so yet. We have had wet seasons. They tell me you cannot grow it in a wet season.

A Member: How do you plant it?

Gov. Hoard: I sow it with a drill. You have those drills in this state where the grass seed box is in front?

A Member: Yes.

Gov. Hoard: Yes, that is the same as I have. I sow about 25 pounds to the acre on very heavy strong soil. Mr. Wing recommends 15 pounds. I prefer 10 pounds more for the sake of making it grow finer. I broke up a year ago 28 acres of alfalfa sod and planted it to corn. The neighbors say they never saw such a crop of corn on the place before. The mechanical effect of alfalfa roots upon that land is wonderful. It required three horses weighing about 1,500 pounds apiece with a jointer to break it, and you could hear it, it sounded like they were tearing the strongest piece of canvas you ever saw. It was like plowing through a hazel bush. The roots were in the soil so deep and so strong that it has a mechanical effect upon the land like this. A year ago last spring when I was breaking up and plowing my land—my land is heavy clay, it keeps me a little late sometimes, I got very anxious. I went at my plowing, and feeling I was plowing when it was wrong, it was wrong, and all my land plowed shiny, you know how that is, all except the alfalfa field, and that plowed like an ash heap. I began to study. That field was like a paper box bored full of holes ten to fifteen feet deep. I tell you we have dug alfalfa roots from these old fields twelve to fifteen feet down, went down to find out. You can see what a tremendous mechanical effect such a plant has upon the land. One old German says, "Mein Gott in Himmel, I grow not that stuff on that lant, everything run all the way down through." I thought it would, that it might injure it, but it serves to oxygenate the soil, and grinds and breaks it up and has a mechanical effect like a sub-soiling plow on the land.

A Member: Do the roots go down through hard pan?

Gov. Hoard: If you have hard pan very near the surface—the larger part of your land is not hard pan that will interfere with it.

A Member: Hard yellow clay?

Gov. Hoard: It grows right straight through it. Goes right down through a yellow clay. I have that on portions of my farm. You dig down five and six feet and you will strike this hard and yellow clay, sticky yellow. It was a white oak soil.

Now, I have given some ideas of its feeding value, some ideas about its growing. Let me say this: prepare your soil, make as good a seed bed as possible. I threw away $60 worth of seed of a rye field, harrowed the rye field three times, loaded the harrow, tore it all to pieces, and sowed the alfalfa on, thinking it would grow as well as clover. I never got a thousand spears of alfalfa, got the biggest crop of rye I ever did get. But sow it with about a bushel of barley. Last year I sowed a bushel, but being a wet season part of it lodged. I got 40 bushels seed off the barley, 40 bushels for one. But it was an unusual season.

A Member: How about 60 day oats?

Gov. Hoard: I do not know.

A Member: How will it do on sandy soil?

Gov. Hoard: If you can get it started all right—if you will give a coat of manure, a heavy coat of manure. Suppose you give it a good heavy coat of manure in the fall, and then in the spring, and the next thing you go on with a disc and gave it a good heavy discing, harrowing, until you fine it down, then if you could give it about 30 bushels wood ashes, it is very greedy for that. If you can't get wood ashes you might get muriate or sulphate of potash, and disc your land that way and start it. If you can get it going through the first summer it will be all right from that time on.

## On Limestone Land.

A Member: What about growing on limestone land?

Gov. Hoard: It prefers limestone land.

A Member: Clover burns out; it would not stay in. Does alfalfa do the same thing?

Gov. Hoard: Clover wants limestone land.

A Member: Can't get it to stay more than three years.

Gov. Hoard: The reason is that clover is a biennial and when once it forms its seed it dies of its own volition.

I do not believe there is any particular difficulty in growing alfalfa in Pennsylvania. Does the sweet clover grow here by the side of the road?

A Member: Yes.

Gov. Hoard: You need give yourself no uneasiness. Wherever sweet clover grows alfalfa grows almost indigenously if a man knows how to handle it.

A Member: Where do you buy your seed?

Gov. Hoard: I buy my seed usually of seedsmen, but I am pretty particular about it.

A Member: Which ones?

Gov. Hoard: Well, that is hardly fair to say, but I usually have sent into Montana and bought my seed.

## How to Cure.

With alfalfa as with all kinds of hay, drying hay is not curing it. I want to repeat it, drying hay is not curing it. There is a wonderful difference in the feed value of clover and alfalfa, whether you cure in the cock or cure in the winrow and the sun. If you put it into the cock just as soon as the rake will gather it, just as soon as it will work on the rake, rake it up into the winrow, and from that up into the covered cocks, well capped. I use the hay cap. You do not know what is going to happen. The first crop is in the first of June, and I put on the hay cap. I have 1,500 of those little caps, they cost $120 a thousand, 12 cents apiece. (Explaining the use of the cap by illustration.)

A Member: Did you spread this hay after you put the caps on?

Gov. Hoard: About an hour or two. My men came along and lift it open for an hour or two ,just throw it open so the air can get to it, and oxygenate it, you know, and that will just finish the job. I want to haul it to that barn when it is just so the leaves won't fall.

A Member: How much do you spread each shock?

Gov. Hoard: Just a little, throw it out so as to give it a little air.

A Member: Do you like to haul in the heat of the day?

Gov. Hoard: I do not pay any attention to it. I haul it just as fast as I can. I am anxious to haul it before the leaves will drop.

A Member: What is your idea about inoculating the soil with other soil?

Gov. Hoard: I have tried it. I have drawn soil from the side of the road where sweet clover was growing, and drawn soil from one old field I had, on to a new field.

A Member: Do you think it helped it?

Gov. Hoard: Helped it. A year ago last fall I inoculated 22 acres with culture from the Department at Washington.

A Member: How much to the acre of the old soil?

Gov. Hoard: About a thousand pounds.

(Adjournment of the joint session. Stock Breeders to meet January 18, 1906.)

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# PENNSYLVANIA DAIRY UNION OFFICERS 1906

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## LIST OF CREAMERIES IN PENNSYLVANIA

The following list is published with the two-fold purpose of furnishing it to those who want such a list and with the hope of securing correction, addition or omission. First class mail matter addressed to these parties has not been returned, therefore it is assumed that these creameries are still operated. It would be very much appreciated if parties knowing of creameries or cheese factories not included here, or included but not now in operation, will send word to that effect to

THE PRESIDENT,
Pennsylvania Dairy Union,
State College, Pa.

| | |
|---|---|
| Adams Co. | |
| Bermudia | B. D. Hostetter |
| Cashtown | Cashtown Creamery Co.,<br>L. W. Swartz, Manager. |
| East Berlin | E. Berlin Creamery Assn. |
| East Berlin | J. D. Hershey |
| Gettysburg | Jerry J. Plank |
| Guernsey | John Geiger |
| Latimore | Latimore Creamery Co.,<br>Jos. Lerew, President |
| Latimore | Wagner & Swartz |
| New Oxford | J. Diller & Co. |
| Allegheny Co. | |
| Wilkinsburg | Brightview Dairy Co. |
| Armstrong Co. | |
| Cochran's Mills | Cochran's Mills Creamery |
| Dayton | Dayton Co-op. Creamery Assn. |
| Top | King & Woodward |
| Whitesburg | Whitesburg Creamery,<br>Blaney & Son, Props. |
| York Springs | B. D. Hostetter |
| Beaver Co. | |
| Hookstown | Hookstown Creamery |
| Bedford Co. | |
| Loysville | Cold Springs Creamery<br>Dickinson, Gilber & Kean |
| Rainsburg | George Morgart |
| Berks Co. | |
| Bally | Frank Janson |
| Bechtelsville | James Moyer & Bro. |
| Berne | Levi M. Miller |
| Bernville | Ahrens & Richardson |
| Bernville | Bernville Creamery Co. |
| Bethel | Ahrens & Richardson |
| Bowers | Bowers' Creamery Co. |
| Boyertown | Grim's Mill Creamery |
| Boyertown | Boyertown Creamery |
| Calcium | Calcium Creamery |
| Calcium | Cleaver & Hoffman |
| Centreport | Samuel Kelchner |
| Centreport | Levi M. Miller |
| Clayton | Clayton Butter & Cheese Co. |
| Crosskill Mills | Ahrens & Richardson |
| Douglassville | Charles Buckwalter |
| Eshback's | Hines Bros |
| Exeter Station | H. B. Levan & Co. |
| Fleetwood | Fleetwood Creamery |
| Fleetwood | Daniel Kelchner |
| Geiger's Mills | Cold Run Creamery Co. |
| Geiger's Mills | Geiger's Mills Creamery |
| Hamburg | N. A. Coufer |
| Huff's Church | Nathan Lehser |
| Kempton | M. L. Ritter |
| Kempton Station | Howard G. Kimmel |
| | Excel'r Dairymen's Assn. |
| Klinesville | Klinesville Creamery |
| Kutztown | Kutztown Creamery |
| Landis' Store | Jos. Boyer & Bro. |
| Lenhartsville | F. B. Levan |
| Lime Kiln | Oley Line Creamery |
| Little Oley | Fritzer's Creamery,<br>J. P. Thomas, Prop'r. |
| Lyons Station | Jno. G. Haring |
| Manatawney | Pleasantville Creamery |
| Mertztown | F. Moyer & Co. |
| Mohrsville | Isaac S. Fraunfelter |
| Morgantown | Jacob Hartz |
| Morgantown | Morgantown Creamery |
| New Berlinville | Congo Creamery |
| New Berlinville | Gilbertsville Creamery |
| New Berlinville | W. H. Moyer |
| New Jerusalem | J. S. Henrich |
| North Heidelberg | Klapp & Kalback |
| North Heidelberg | Klopp's Creamery |
| Obold | Kalbach & Obold |
| Oley | Hartman & Bros. |
| Reading | Franklin St. Creamery |
| Reading | St. Lawrence Creamery |
| Reading | Spang & Zacharias |
| Rehrersburg | Ahrens & Richardson |
| Rehrersburg | Rehrersburg Creamery |
| Schofer | A. Gottschall |
| Shartlesville | Ahrens & Richardson |
| Shoemakersville | Shoemakersville Cream. |
| Stonersville | Ahrens & Richardson |
| Straustown | Ahrens & Richardson |
| Topton | A. S. Heffner |
| Upper Bern | Levi M. Miller |
| Virginsville | M. L. Ritter |
| West Leesport | Samuel H. Lenhart & Son |
| Windsor Castle | M. L. Ritter |
| Yellow House | Amos Hartman |
| Yellow House | Home Creamery |
| Blair Co. | |
| Tyrone | Hoffman Bros. Creamery |
| Henrietta | Elmer S. Berget |
| Henrietta | D. D. Morell |
| Bradford Co. | |
| Alba | Alba Butter Mfg. Co. |
| Allis Hollow | Allis Hollow Creamery Co. |
| Allis Hollow | Union Creamery Co. Ltd. |
| Austinville | Austinville Co-Operative<br>Creamery Co. |
| Burlington | Burlington Creamery |
| Brad | Wyalusing Creamery |
| Cadis | J. W. Prince |
| Camptown | Fuller & Blocker |
| Columbia Cross Roads | Austinville Creamery Co. |
| Coryland | Coryland Creamery |
| Durell | Durell Creamery |
| East Canton | Silverdale Creamery Co. |
| East Smithfield | D. A. Stephen |

East Troy.....East Troy Butter Mfg. Co.
Grover.........................S. S. Vermilya
Le Raysville..................W. B. Stevens
Milan................Pennsylvania Cry. Co.
Minnequa...................James Ketcham
Myersburg.........M. Butter & Cheese Co.
New Albany...New Albany Creamery Co.
North Orwell................George Pennell
North Orwell...............Baker Brothers
Potterville.......Potterville Creamery Co.
Potterville.......Orwell Creamery Co. Ltd.
Smithfield................Stevens Creamery
South Warren..............Baker Brothers
South Warren.............Best & Wheaton
Stevensville..............Stevensville Assn.
Troy.........................S. H. Heywood
Warren Centre................G. A. Brown
Warren Centre...............A. Rohrbasser
Windham Centre............A. Rohrbasser

Bucks Co.
Argus............................C. T. Hixon
Bedminster..........Bedminster Creamery
Bedminster...................J. F. Hulsheiser
Bedminster........................J. F. Kilmer
Bedminster.............Moyer & Hulshiser
Blooming Glen...Blooming Glen Creamery
Blooming Glen..Pleasant Sprgs Creamery
Buckingham...Blooming Valley Creamery
Buckingham..........................
Buckingham Valley Dairymen's Assn.
Bucksville..................Kaiser & Kramer
Bursonville....................Hixon & Mills
Carversville.........................Cary Betz
Carversville.......................C. Roberts
Chalfont.................Chalfont Creamery
Chalfont.................A. H. Faust & Co.
Church Hill..........Church Hill Creamery
Church Hill.......................Jos. Guldin
Cressman.................Milton H. Hinkle
Danborough.............Ottsville Creamery
Doylestown.........Cold Spring Dairy Co
Dublin...........Dublin Dairymen's Assn.
Durham..................Durham Creamery
Erwinna........................George Scott
Forest Grove......Forest Grove Creamery
Gardenville..................Gotwals & Son
Geryville..............Krausdale Creamery
Jamison.....Warwick Township Creamery
Keller's Church.......Wilson S. Atherholt
Levin.........................Frank Heterick
Makefield...............Makefield Creamery
Milford Square..........Henry G. George
Milford Square...............A. C. Moyer
Neshaminy......................W. W. Carr
Neshaminy..........Paul Valley Creamery
Nockamixon...F. M. Moyer Via Ferndale
Nockamixon.........Nockamixon Creamery
Ottsville.................Aaron Leatherman
Passer...........................J. H. Shelly
Perkasie..................Henry O. Moyer
Pineville.................Pineville Creamery
Pipersville......................A. M. Gerhart
Pleasant Valley.........Diming & Gerhart
Pleasant Valley...............J. H. Shelly
Plumsteadville........................
...........Plumsteadville Cream. Assn.
Quakertown......................C. T. Hixon
Quakertown.............William S. Taylor
Richlandtown..Keller's Church Creamery
Richlandtown.....Richlandtown Creamery
Richland Centre..........Landis & Moyer
Richlandtown.....Cold Springs Creamery
Shelly........................Henry B. Weiss
Solebury..............Solebury Dairy Assn
Spinnerstown.......Dairymen's Association
Springtown....................Hixon & Mills
Steinburg.........................O. H. Erdman
Tohickon..........................J. D. Stover
Trumbauersville..Sinking Springs Cream.
Wismer...........Union Dairy Association
Yardley..................Yardley Creamery
Zion Hill.....................Henry B. Weiss

Butler Co.
Conoquenessing.........Stern & Dumbaugh
Great Belt............Great Belt Creamery
Denny...........West Penn Creamery Co.
Portersville.....Portersville Creamery Co.
Prospect............Prospect Creamery Co.
Slippery Rock..Slippery Rock Cream. Co.

Cambria Co.
Carrolltown............Farmers' Creamery

Carbon Co.
Little Gap.................W. M. Benninger

Centre Co.
Bellefonte..........Rock Farms Creamery
Bellefonte..........Howard Creamery Cor.
Howard P. O.................C. M. Muffley
Rebersburg.................Frank & Stover
Rebersburg....Spring Mills Creamery Co.
Spring Mills.........Spring Mills Creamery
State College......State College Creamery

Chester Co.
Anselma.................Pikeland Creamery
Avondale.............Lamborn's Creamery
Brandywine Manor........Reid's Creamery
Buck Run ...........Ercildoun Creamery
Buck Run ..........C. J. & J. E. Moore
Cedar Knoll..........Lafayette Creamery
Chadds Ford ......E. Darlington & Bro.
Chesterville ................Marvell Bros.
Cochranville............Cochran Creamery
Cochranville........Cochranville Creamery
Collamer.........................Isaac Evans
Collamer ................W. Evans & Son
Collamer ..........................E. B. Herr
Cossart..............Brandywine Creamery
Cossart ........................James B. Pyle
Doe Run ..........................H. A. Clark
Doe Run .............Darlington Creamery
Doe Run ..................Milton Darlington
Doe Run ........................H. A. Taylor
East Coventry...East Coventry Creamery
Elk View...........................Dr. Quimby
Elk View ..................T. Thomas Webb
Embreeville..............J. L. Cunningham
Fairville ...............Sharpless Creamery
Font .....................Fairmont Creamery
Glen Roy...........................E. B. Herr
Hickory Hill.......Hickory Hill Creamery
Honeybrook..........C. D. & P. H. Emery
Honeybrook .......Pennsylvania Creamery
Kelton .........................S. Morris Jones
Kembleville.................Byers' Creamery
Kembleville .........Kembleville Creamery
Kennett Square.......Bernard's Creamery
Kennett Square....Kennett Square Cream.
Kennett Square..............Wm. Sharpless
Landenburg................Alfred Sharpless
Lenover ...........................H. S. Boyd
Leonard ...............Rosedale Creamery
Lincoln University...........Nieweg Bros.
Londonderry...................J. H. Donald
London Grove................J. C. Sharpless
Marsh .......................Marsh Creamery
New Garden .....New Garden Creamery
New London ...................Frank Kirk
New London.......Theodore Kirk & Son
Oxford ........................Big Elk Dairies
Oxford ................Hill Crest Creamery
Oxford ................H. D. & E. A. Pugh
Oxford..........Geo. D. Woodside & Co.
Parksburg...............Cochran Creamery
Phoenixville .........Red Bank Creamery
Pughtown.........................D. Wadleigh
Roberts ...........Thomas Hatfield & Son
Russellville ..................J. H. Brosius
Russellville .........Russellville Creamery
St. Peters..............Farmers' Creamery
Schuylkill ............Schuylkill Creamery
Sheeder P. O.....James C. Roberts & Son
Sheeder ..................Vincent Creamery
Spring City .........Spring City Creamery
Suplee ...............Enterprise Creamery

Toughkenamon ...........Josiah Lamborn
Toughkenamon...............Wm. Sharpless
Tweedale..........................E. B. Herr
Unionville....................John C. Gray
Unionville.............Unionville Creamery
Vincent ......................E. B. Gasher
Vincent ..........................R. Heistand
Wagontown ...............Harry Schrack
Wagontown ..........West Caln Creamery
Warwick .................Marst Creamery
West Chester..........Allerton Creamery
West Vincent..Lewis H. Evans, Secretary
West Chester.....George Faucetts & Son
West Chester........... Harper Creamery
West Chester.............Wm. B. Harvey
West Chester.......Homestead Creamery
West Chester.....West Chester Creamery
West Chester........West Chester Dairy
West Chester........E. Roberts' Creamery
Whitford ..............Whitford Creamery
Whitford.................Arnold M. Wilber
Williams' Corners.....Charles Buckwalter
Williams' Corners........Morris Mackissic
Willowdale ........Willowdale Creamery
Wrightsdale .......Wrightsdale Creamery

Crawford Co.
Beaver Centre...............Clark & Gates
Beaver Centre.........Green, Clark & Co.
Blooming Valley
Blooming Valley Cheese Co.
Centreville .........Centreville Creamery
Conneautville .................J. W. Clark
Crossingville .....Crossingville Creamery
Dicksonburg .................T. S. Lavery
Espyville. ........................A. W. Wall
Frenchtown .............Augustus Polley
Guys Mills ...................L. C. McGaw
Jewell ........Jewell Cheese Factory Co.
Jewell..........................N. O. Stanford
Hickernell ..........Hickernell Creamery
Lincolnville ........Lincolnville Creamery
Linesville .......................A. B. Griffin
Long's Stand ..................A. J. Miller
Miller's Station...............L. C. McGaw
Penn Line ......................L. C. McGaw
Pinney Corners ............D. H. Nodine
Pinney Corners....Richmond & Woodcock
Rundell's ...............McGaw & Cooper
Saegerstown.........................A. B. Long
Saegerstown ...............Long & Reiche
Spartansburg ..........Concord Creamery
Spartansburg ...............Hyde & Baker
Springboro ...................J. J. Howard
Townville .......................A. L. Squier
Troy Centre ...........Grove & McDowell
Troy Centre ......Troy Centre Creamery
Westford .........................J. S. Martin
Woodcock .....................N. J. Gerrow
Woodcock ........................Price Bros.
Woodcock ...............Sherred & Norris

Clarion Co.
Clarion ...................Clarion Creamery
Lickingville .......Pioneer Creamery Co.
Limestone ......Limestone Creamery Co.
Marble ...............Enterprise Creamery
Newmansville ......Pioneer Creamery Co.

Clearfield Co.
Clearfield ........Clearfield Creamery Co.
Clearfield ..................James Mitchell

Clinton Co.
Loganton .............Loganton Creamery
Salona .....................Salona Creamery

Columbia Co.
Berwick ...............Fairview Creamery
Millville ...............Millville Creamery

Cumberland Co.
Allen ...Cumberland Valley Creamery Co.
Carlisle ......................Letort Creamery
Craighead .....................B. W. Hasler
Hatton ................Keystone Creamery
Mechanicsburg,
Cumberland Valley Creamery
Mechanicsburg...Mechanicsburg Creamery
New Kingston
Cumberland Valley Creamery Co.
Newville............Big Springs Separator
Shippensburg............B. D. Biggs & Son
Shippensburg................. Jacob Reigle
Williams' Mills,
Cumberland Valley Creamery Co.

Dauphin Co.
Berrysburg .................Peter L. Stine
Deodate .......................Ezra C. Foltz
Fisherville ...............Cornelius Bixler
Fisherville ..........Fisherville Creamery
Grantville ................Stauffer & Rapp
Gratz...............................Jacob Arnott
Harrisburg ......................S. F. Barber
Hummelstown ...........Model Creamery
Millersburg .......................C. F. Moyer
Powl's Valley ............C. Bixler & Son
Progress ...................John H. Sheesley
Swatara ..............Conewago Creamery
Union Deposit ............Stauffer & Rapp

Delaware Co.
Brandywine Summit.....Miller & Heyburn
Chadd's Ford .......E. Darlington & Bro.
Cheyney ......................Thos. Cheyney
Cheyney ..................Frank G. Thomas
Concordville ..............P. E. Sharpless
Darling .............Darlington Creamery
Darlington........M. F. Darlington & Son
Villanova .............Villanova Creamery
Wallingford ........Wallingford Creamery
Wallingford.......Wallingford Dairy Co.
Ward................Pennock E. Sharpless

Elk Co.
Ridgway .........Ridgway Creamery Co.
St. Mary's ...........St. Mary's Creamery

Erie Co.
Albion .........................W. S. Boyle
Corry .......................Corry Creamery
Corry ...............................J. C. Wales
Edinboro ......................Lavery & Co.
Ferdinand.......W. Union Cheese Factory
Franklin Corners...........Frank Billings
Greenfield..Greenfield Butter & Cheese Co.
Greenfield .....................Thomas Bros.
Itley ...........................William Marsh
Juva ..................Barnes & Lockwood
Lavery ...........................J. S. Lavery
Le Boeuf.......................C. M. Wheeler
Lovell's Station ........Crowells McCrary
McLane ..........................Wm. Marsh
McKean ..........................J. C. Spence
McLallan's Corners....Shrade & Rockwell
Mill Village .....................J. M. Tuttle
Mill Village ...........Wilson S. Durham
Mystic.....................J. H. Waterhouse
Ovid ......................Mark L. Howard
Phillipsville .................Alfred Moore
Pont ...............................R. B. Gates
Sterrettania .............Joseph H. Hauch
Sterrettania .......Sterrettania Creamery
Tellar ..........................C. D. Faulkner
Union City ...............Geo. W. Carroll
Wattsburg ................F. W. Edmunds
Wattsburg .......Keystone Creamery Co.
Waterford ...............Sharps Creamery
Waterford ............,Vananden & Gillet

Fayette Co.
East Riverside ...............M. R. Jacobs
Farmington ...............Cheese Factory
New Haven.......New Haven Butter Co.

Franklin Co.
Chambersburg....Chambersburg Creamery
Edenville..........Franklin Creamery Co.
Green Village...Green Village Creamery
Guilford Springs............Spring's Dairy
Lemaster's.........J. R. Lemaster & Son
Markes .............J. R. Lemaster & Son
Mercersburg...Mercersburg Creamery Co.
Shady Grove...Nicodemus Creamery Assn
Waynesboro......Blue Mountain Creamery

Williamson.....Williamson Creamery Co.
Willow Hill...............McCurdy & Elder
Fulton Co.
McConnellsburg.................W. L. Sloan
McConnellsburg...McConnellsburg Cream.
Greene Co.
Carmichaels.........Carmichaels Creamery
Huntingdon Co.
McAlevy's Fort..McAlevy's Fort Creamery
Morrell .....Morrell Butter & Cheese Co.
Pennsylvania Furnace......Hoffman Bros.
Petersburg ..........Petersburg Creamery
Indiana Co.
Elder's Ridge..Co-operative Creamery Co.
Homer City .................H. C. English
Homer City.........Homer City Creamery
Jefferson Co.
Sugar Hill..............J. N. Atwell & Co.
Juniata Co.
Cocolamus ....................Brown & Co.
East Salem .......................S. Schlegal
East Salem..........East Salem Creamery
McAllisterville
Shellenberger & Hambright
McCoysville ................B. C. Cubbeison
Mifflintown ................J. G. Haldeman
Port Royal..........Port Royal Creamery
Thompsontown.............J. G. Haldeman
Lackawanna Co.
Moscow .................Moscow Creamery
Scranton .......................Wm. Conrad
Scranton .......................E. S. Decker
Lancaster Co.
Bainbridge ................Coday Creamery
Bart ..........................Bart Creamery
Bartville ..................W. B. Ferguson
Bethesda ..............Bethesda Creamery
Bird-in-hand........Bird-in-hand Creamery
Bird-in-hand.................... F. Bowman
Blue Ball .................S. H. Musselman
Buck ..........................Buck Creamery
Cambridge ..........Cambridge Creamery
Cambridge ........E. J. & P. H. Emery
Cambridge ...............George I. Emery
Christiana ...........Christiana Creamery
Cocalico ................Cocalico Creamery
Colemanville ................George Garret
Collens ........................Herr & Maull
Denver ........................Daniel Gebble
Elizabethtown...Elizabethtown Creamery
Ephrata ............................J. H. Yeiser
Fairland ..........................John Reist
Farmersville .............Harry J. Shaffer
Fertility............Fertility Creamery Co.
Florin ......................Florin Creamery
Furniss ..........................C. P. Grigg
Gap ..............Gap Creamery Co., Ltd.
Glenola ...............Johnsville Creamery
Glenola .......................H. M. Stauffer
Goshen ...............The Elam Dairy Co.
Goshen......................Goshen Creamery
Goshen ........................Amos Walton
Hahnstown ..............John Fry's Sons
Kirkwood ..........................Ezra Hess
Kirkwood ...................Graybill Stone
Landisville ...............Levi H. Hershey
Landisville...........Landisville Creamery
Lititz......................Garber, Reist & Co.
Manheim ......................Hershey Bros.
Marticville .................M. C. Eshelman
Mascot ...............Stumptown Creamery
Mastersonville ....Farmers' Creamery Co.
Mastersonville
Mastersonville Creamery Assn.
May ......................Johnson & Gilbert
McSparran.........Peters' Creek Creamery
McSparran..........Willow Dale Creamery
Mt. Joy ...........Farmers' Creamery Co.
Mt. Joy.................Reist, Nissley & So.
Mount Nebo.....Mt. Nebo Creamery Asso.
New Providence.....Dickinson & Gilbert
Octoraro ......................J. H. Brosius
Pleasant Grove ............Carter & Mills
Pleasant Grove ......Conowingo Creamery
Pleasant Grove ..........Garber & Swisher
Quarryville ..........Dickinson & Gilbert
Quarryville ..........Quarryville Creamery
Reinhold Station..Reinhold Station Cream.
Safe Harbor.....Kaufman & McMesbong
Safe Harbor ............Manor Creamery
Smithville........Harry S. Wigging & Co.
Smyrna..............Smyrna Creamery Co.
Spruce Grove .........................M. Keech
Spruce Grove................Milton Keech
Stevens ..................Stevens Creamery
Terre Hill.............Terre Hill Creamery
Unicorn ..................Unicorn Creamery
Unicorn ..........................J. E. Moore
White Rock ...........Elm Creamery Co.
White Rock ................Wm. G. Patton
White Rock ........White Rock Creamery
Windom .........Champion Creamery Co.
Lawrence Co.
Enon Valley .......Enon Valley Creamery
Neshannock Falls
Neshannock Falls Creamery
New Castle ...........Midway Butter Co.
Pulaski ......................John S. Evans
Volant.......................J. Wilken & Son
Lebanon Co.
Bellegrove ...........Cleona Creamery Co.
Campbellstown..Campbellstown Creamery
Cleona ......................Cleona Creamery
Fontana .............Cleona Creamery Co.
Fredericksburg................L. S. Gerhart
Jonestown.....................Z. T. Gingrich
Lawn .................Lawn Creamery Co.
Lebanon.......................City Creamery
Millbach ...........Millbach Creamery Co.
Myerstown ..............Bassler Creamery
Myerstown ...........George W. Donges
Myerstown ..................Mengle & Yost
Ono ...........................L. S. Gerhart
Palmyra.....Elizabethtown Creamery Co.
Prescott .........................Henry Haak
Richland Station
Big Spring Creamery Co.
Richland Station........G. E. Brownback
Richland Station...............Henry Haak
Lehigh Co.
Alburtis.......Spring Creek Creamery Co.
Allentown .........Spring Creek Creamery
Catasauqua ..........Howertown Creamery
Coopersburg .............W. H. Steininger
Coopersburg ..................Landis & Co.
Hosensack ..................L. H. Brownell
Hosensack ..........Hosensack Creamery
Lanark ..........................J. C. Richard
Lyon Valley.......Lyon Valley Creamery
Lyon Valley ...................M. C. Rollman
Macungie ................E. M. Laux & Co.
Macungie .............Macungie Creamery
Macungie ...................Schuler Brothers
New Tripoli ................Miller & Gilmer
Plover ..........................W. R. Schuler
Sigmund ................Jacob Faust & Son
Steinsville ............Steinsville Creamery
Vera Cruz.........................Schuler Bros.
Vera Cruz ...........Vera Cruz Creamery
Wanamaker ............John K. Fetherolf
Werley's Corner ............O. P. Werley
Luzerne Co.
Hazleton ..................Rhone Trescott
Hazleton .....................J. M. Williams
Wilkes Barre.....Standard Dairy Co. Ltd.
Lycoming Co.
Muncy .......................Muncy Creamery
McKean Co.
Eldred ................Eldred B. & C. Co.
Kane ...................Kane Creamery Co.
Myrtle ...........................R. G. Wooden
Port Allegany..........Acme Creamery Co.
Port Allegany...........................L. B. Ray
Port Allegany...........................T. B. Ray

Smethport
Naundah Butter & Creamery Co.
Mercer Co.
Greenville ...........Greenville Creamery
Grove City.........Library Grove City Coll
Grove City ....................A. H. Beatty
Indian Run...................T. P. Munnell
Jamestown .....................W. B. Plant
London ..............London Creamery Co.
Mercer ..............Louden Creamery Co.
Mercer ..........McDonaldson & Zehniser
Mercer...........Mercer Creamery Co. Ltd.
New Vernon ......................J. A. Carey
Sharpsville ...........Sharpsville Creamery
Volant .........................S. A. Williams
Mifflin Co.
Allensville ............Allensville Creamery
Belleville ...............Belleville Creamery
Mattawana .........Mattawana Creamery
McVeytown ............John M. Hassinger
Reedsville ..................D. Z. Detweiler
Reedsville....................A. L. Detweiler
Reedsville ............Reedsville Creamery
Monroe Co.
East Stroudsburg
Beechpond Creamery Co.
Lamartine............Salem Creamery Co.
Limestone........... Greenville Creamery
Montour Co.
Washingtonville.....Mengle & Luckenbill
Montgomery Co.
Cedars ..........................J. P. Bustard
Colmar ....................Colmar Creamery
Colmar ...........................John Holley
Congo ......................Congo Creamery
Creamery...Perkiomen Dairymen's Assn.
Earlington ..................H. C. Durstine
Earlington ................J. G. Hunsicker
Earlington .......................John Landis
East Greenville...East Greenville Cream.
East Greenville ..............Adam Krauss
Fairview Village
Fairview Village Creamery Assn.
Franconia .........................J. N. Freed
Franconia ..........Indian Creek Creamery
Franconia ..................John K. Landis
Frederick ............Green Tree Creamery
Grater's Ford .....................A. G. Fly
Grater's Ford...Grater's Ford Cream. Co.
Hatfield .........Drake's Corner Creamery
Hatfield .........................Aaron Tyson
Hillegas ............................J. H. Faust
Hillegas .............Hillegas Creamery Co.
Hoppenville ..........McLean's Creamery
Hoppenville ......................J. T. Moyer
Iron Bridge...Harmony Grange Creamery
Kulpsville.....Towamensing Creamery Co.
Lederachsville...........Andrew T. Garber
Lederachsville.....Wide Awake Creamery
Lederachsville .......Worcester Creamery
Limerick ...........Garret E. Brownback
Limerick ............Samuel Y. Eisenberg
Linfield ...................G. E. Brownback
Linfield ..............Samuel Y. Eisenberg
Linfield .....................P. J. Reifsnyder
Lucon ..................Lucon Creamery Co.
Mainland .........Mainland Creamery Co.
Narcissa ......Plymouth Valley Creamery
North Wales ..............C. W. Hoffman
Obelisk......Green Tree Dairymen's Assn.
Perkiomenville ......................J. M. Reed
Pottstown ............................S. G. Fly
Pottstown ..........Miller Bros. Creamery
Prospectville..Prospectville Creamery Co.
Royersford .................Mingo Creamery
Salfordville........Upper Salford Creamery
Sanatoga ..............Sanatoga Creamery
Sassmansville...Sassmansville Cream. Co.
Schwenksville .............William Bromer
Schwenksville..Dairymen's Creamery Ass.
Schwenksville............William G. Ziegler
Shannonville ................J. D. Godshalk
Skippack...Schwenksville Creamery Assn.
Spring House ...................R. R. Jones
Trappe ...........Spring Valley Creamery
Willow Grove...Willow Grove Creamery
Worcester......Farmers' Creamery Assn.
Yerkes ..................Yerkes Creamery
Northampton Co.
Bath ..........................W. H. Landis
Benningers........W. M. Benninger & Son
Bingen ....................Campbell & Appel
Bushkill Centre...Bushkill Centre Cream.
Butztown .............Butztown Creamery
Cherryville ..................L. D. Meckley
Hecktown ..........Heckertown Creamery
Hecktown.....................W. H. Landis
Hecktown ...................S. D. Steuben
Moorestown ....................H. S. Kratz
Nazareth ........................H. S. Kratz
Nazareth .........Nazareth Creamery Co.
Petersville ......................Wm. A. Slot
Plainfield ............Plainfield Creamery
Stockertown .......Stockton Creamery Co.
Stone Church.............W. M. Benninger
Stone Church.............Jordon McIntyre
Walnutport ..............W. M. Benninger
Weaversville.......Dairymens' Association
Weaversville ................Wm. M. Smith
Youngs ........................Frank Young
Northumberland Co.
Chillisquaque ....................C. L. Butler
Milton......Pleasant Valley Creamery Co.
Montandom..........Cold Spring Creamery
Sedan ..................................Wm. Dunn
Sunbury ................Chas. R. Rinehart
Sunbury ...........Sunbury Creamery Co.
Perry Co.
Elliottsburg ....................E. J. Kistler
Loysville..........Loysville Creamery Co.
Millerstown .........................J. C. Kipp
Pike Co.
Matamoras .........Matamoras Creamery
Potter Co.
Bingham Centre ...............W. J. Clark
Bingham Centre ...............R. H. Howe
Bingham Centre ............Richard Labor
Elmer ......................Cheese Factory
Newfield .......................W. J. Grover
Raymonds ....................E. J. Conable
Raymonds ...................W. B. Perkins
White's Corners...White's Corners Cream.
Schuylkill Co.
Orwigsburg ....................A. F. Kimmel
Rausch's.....................Salem W. Koch
Tamaqua ............Henry M. Enterline
Snyder Co.
McClure .........................Ulsh & Bro.
Susquehanna Co.
Alford ........................Alford Creamery
Auburn Centre
Shannon Hill Co-Op. Creamery
Auburn 4 Corners
Auburn 4 Corners Creamery Co.
Birchardville ..........................C. P. Ball
Birchardville.......Birchardville Creamery
Birchardville......Excelsior Creamery Co.
Brooklyn ...............Brooklyn Creamery
Choconut...Choconut Valley Creamery Co.
Dimock ............Dimock Creamery Co.
East Rush.......East Rush Creamery Co.
East New Milford
Mountain Lake Creamery Co.
Fairdale ............................C. P. Ball
Fairdale ................Fairdale Creamery
Fairdale ........................Seiler Bros.
Forest Lake
Forest Lake Creamery Co.
Forest Lake
Kingsley Union Creamery Co.
Franklin Forks..Franklin Forks Creamery
Gibson .................Harford Dairy Co.
Heartlake ............Heartlake Creamery
Harford ...............Harford Dairy Co.

Hop Bottom
Hop Bottom Butter & Milk Co.
Hop Bottom.........Hop Bottom Creamery
Kingsley......Kingsley Creamery Co. Ltd.
Kingsley.........Kingsley Union Creamery
Kingsley..Robinson Wollworth & Kingsley
Lawsville Centre
Lawsville Co-Op. Creamery
Little Meadows.....Iron Bridge Creamery
Little Meadows..Little Meadows Creamery
Middletown.....Iron Bridge Creamery Co.
Middletown Centre
Middletown Ctr. Creamery Co.
Montrose ...............Montrose Dairy Co.
Montrose ........................Seiler Bros.
Montrose...........................Beech Bros.
Montrose....................Beebe Creamery
Montrose.........Montrose Creamery Co.
Montrose............Silver Lake Creamery
New Milford.....Kingsley Creamery Co.
New Milford...New Milford Creamery Co.
Rush ...................Rush Creamery Co.
Rush .........Rush Centre Creamery Co.
Rushboro ...........................Treasurer
Rushboro .......Jersey Hill Creamery Co.
Rushboro........East Rush Creamery Co.
Rushville ........Rushville Creamery Co.
Silver Lake........Quaker Lake Creamery
Springville ............Springville Creamery
South Gibson ..........Harford Dairy Co.
Tiffany ..................Tiffany Creamery
Thompson ............Thompson Creamery

Tioga Co.
Austinburg ........................E. A. Bean
Austinburg ..................Cheese Factory
Balsam ...........Balsam Cheese Factory
East Chatham ....................D. Avery
Elkland ..................Elkland Creamery
Elkland ........................Cheese Factory
Keennyville ..................Cheese Factory
Knoxville ..........................E. A. Dean
Knoxville ......................Cheese Factory
Knoxville......Pennsylvania Creamery Co.
Lawrenceville.....Lawrenceville Creamery
Liberty .........................Worlin Miller
Little Marsh...................W. Wass & Co.
Little Marsh.................Cheese Factory
Mansfield ......................Pitts & Spurr
Mansfield .........West Sullivan Creamery
Via Lansing..........................J. Rushmore
Nelson....Nelson Separator & Butter Co.
Round Top.......................E. A. Close
Stony Fork.........Stony Fork Creamery
Sylvester ..............................E. O. Bean
Wellsboro ..............................G. B. Close

Union Co.
Lewisburg........Buffalo Valley Creamery
Mifflinburg......Crystal Springs Creamery

Venango Co.
Oil City.......................M. B. Crowther

Warren Co.
Ackley Station.............Young & Clark
Bear Lake ...............Frank Parkhurst
Chandlers' Valley.........Valley Creamery
Columbus .........................J. U. Wells
Garland ...............Garland Cheese Co,
Grand Valley.............Valley Creamery
Lander ..........................James Currie
Lander ..........................E. S. Griggs
Lottsville ..........................Vern Grigg
Spring Creek ........Willowdale Creamery
Sugar Grove..........Acme Creamery Co.
Sugar Grove..............George Hampson
Youngsville.....Youngsville Creamery Co.

Washington Co.
Bulger ..........................Peter Hernes
Bulger........Ohio & Pgh. Milk Co.'s Cr'y
Claysville ..............Claysville Creamery
West Alexandria..McCamom & Chambers
West Alexandria..Jas. A. Chambers & Co.

Wayne Co.
Ariel .....................Lakeside Creamery
Beach Lake.........Beach Pond Creamery
Clemo ................Clemo Creamery Co.
Gravity .........Gravity Co-Op. Creamery
Gravity..............Georgetown Creamery
Honesdale.......Crystal Spring Creamery
Newfoundland.........Hopdale Co-Op. Co.
Seeleyville ......................G. & C. Smith
Seeleyville.....Silver Creek Creamery Co.
Starlight................Starlight Dairy Co.

Westmoreland Co.
Markle ......................Markle Creamery
Mt. Pleasant.......Mt. Pleasant Creamery
Scott Haven..............McGrew & Bros.
Smithton ...............Smithton Creamery

Wyoming Co.
Factoryville.........Factoryville Creamery
Laceyville.....Bradford Co. Creamery Co.
Lemon ........................Lemon Creamery
Nicholson .............Nicholson Creamery
Nicholson .........................L. H. Pratt

York Co.
Big Mount....................A. B. Mummert
Bridgeton ............Bridgeton Creamery
Brodbecks........Brodbecks Sta. Creamery
Brodbecks..................Miller & Bortner
Delta .................Daniel Hollingsworth
Dillsburg....................Dillsburg & Elgin
Dover...................... Dover Creamery
East Berlin..........East Berlin Creamery
Felton...................R. Grove & Brother
Gatchellville.....Pleasant Grove Creamery
Glennville ............Glennville Creamery
Hanover ..............Hanover Creamery
Hanover..........York & Adams Creamery
Hanover................Reist, Nissley & Co.
Muddy Creek Forks,
Pleasant Grove Creamery
New Freedom,..........August J. Gillen
New Sinsheim,............Israel K. Zeigler
Porter's Sideling,............C. C. Wooden
Railroad.......................J. A. Wetrick
Shrewsbury..........Shrewsbury Creamery
South Beaver St. York........Mr. Budd
Spring Forge..........Wagner & Swartz
Slate Hill....Cool Spring Creamery Co.
Slab................C. C. Smith & Bro.
Wellsville....................T. C. Cleaver

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## MEMBERS OF PENNSYLVANIA DAIRY UNION

Armsby, H. P......................State College
Armstrong, A. B....................Smith Port
Ahrens & Richardson (Individual Members)
Bernville
Ahrens, H. E.... .......................Bernville
Barber, S. F..........................Harrisburg
Buchanan, J. B...........................Kendall
Branson, J. L.........................Langhorn
Brown, U. S...................................Troy
Bustard, J. P...............................Cedars
Benninger, W. M.....................Walnutport
Big Spring Cry.........................Bellefonte
Brinton, Sam. L..................West Chester
Bran, E. A...............................Knoxville
Barry, R. A..........173 Chambers St., N. Y.
Byler, S. F..........................Bird-in-Hand
Blocher, J. F.........................Spring Hill
Bayard, E. S...........................Pittsburg
Comfort, H. W.......................Fallsington
Cornell, Geo............Columbia Cross Roads

Crandall, C. L...................................Alba
Carter, John I.......................West Chester
Chaffer, O.........................Hatch Hollow
Cumber, Geo. W.........................Steelton
Cornell, A. M..........Columbia Cross Roads
Carter, C...........................West Chester
Coburn Grain & Creamery Co..........Coburn
Carter, J. M............................Chatham
Gilbreath, W. R.......................State Hill
Comfort, J. R......................West Chester
Colegrove, C. B...............................Corry
Darlington, M., Sons...................Pomeroy
Downing, S. R......................Goshenville
Darlington, John H..............West Chester
Dietrich, E. G..........Cathanangies, N. Y.
Duff, W. O..........................Martinsburg
Dinun, D. B....................Thompstontown
Dicher & Gilbert.....................Quarryville
Danner, Harry B..............Porters Sideling
Darlington, Jesse ................West Chester
Dunkle, Martin L.......................Lewisburg
Detrich, Rev. J. D................West Chester
Embroe, W. G.....................West Chester
Millville Cry. Co. (Eckman, C. W.)..Millville
Eldridge, Jonathan...............West Chester
Eshleman, Christian............ Shippensburg
Estus, E. W..............................E. Rush
Forney, D. P............................Hanover
Faucette, C. P., Sons...........West Chester
Forsythe, Geo......................West Chester
Fallett, C. F....................................Ovid
Gill, E. T......................Haddonfield, N. J.
Gramley, T. M......................Spring Mills
Garber, E. L.....................................Lititz
Green Tree Cry. Asso...................Obelisk
Griffis, Bruce S.....................West Leroy
Garner, D. W..................Taneytown, Md.
Gates, F. A..................................Hadley
Good, C. H...........415 North 9th st., Lebanon
Haldeman, J. G.......................Mifflintown
Haines, Chas..............Maple Shade, N. J.
Harvey, Wm. B.........................W. Grove
Hughes, Mark..........................W. Grove
Hartley, R. S............................Pittsfield
Hassler, E. O.........................Harrisburg
Hutchinson, Geo. C............Warriors Mark
Hiesey, S. C...............................Rheems
Howard Cry................................ Howard
Heltman, T. M......................Mackeysville
Ivins, M. H........................Penn Valley
Ingram, Edw. T....................West Chester
Ingram. Chas. B...................West Chester
Jones, Morris.............................W. Grove
Jones, U. H........................Upper Darby
Kelkeffer, E. H..........................Hanover
Lippencoot, B. A.......Haddon Heights, N. J.
Loomis, L. E...............................E. Troy
Lighty, L. W..............................E. Berlin
Lehman, J. R.....................Warriors Mark
Lawrence, W. T.........................E. Canton
Lester, T. W.....................................Troy
Leonard, L. M................Granville Center
Leonard, A......................................... Troy
Lavery, J. S.................................Lavery
Lehman, John H...............Warriors Mark
Lewis, S. H.........................Coudersport
Leonard, Chas. A............Granville Center
Liekert, H. W........................Black Lick
Marshall, Henry.......................... Norway
Morrill, D. A........................Arch Spring
May, L. D.....................Granville Center
Marshall, W. D.............................Lindell
Main, J. M..........................Shippensburg
Murray, C. H..........................Pottsgrove
Martin, Ziba C.....................West Chester
Morris, J. C., M. D....1514 Spruce st., Phila.
Manley, Joel F..........................E. Canton
Neiderriter, S............................ Marble
Notestine, D. E......................Lewistown
Northrup, C. D............................Elkland
Nicely, A. R...............................Hanover
Night, P. M..............................E. Canton
Norton, W. C...........................Creamton
Nissly, Christian L..........................Florin
Nissly, Martin R..................Mechanicsburg
Orr, C. F................................Limestone
Darlington, Edw. J...............Chadds Ford
Palmer, Henry......................... Avondale
Piolet, Louis............................... Wysox
Perham, W. E............................Niagara
Pearson, Dr. Leonard....Sta. B, Philadelphia
Possinger, A. F.......................W. Auburn
Price, Jacob, M. D....................W. Chester
Pugh Bros.................................. Oxford
Pleasant Valley Cry. Co..................Milton
Pearson, R. A,, Prof..............Ithaca, N. Y.
McCoy, L. J..............................Elk City
Reynolds, G. H..................................Alba
Riley, John........................ Harrisburg
Reist, J. G...................................Mt. Joy
Richardson, C. M......................Bernville
Rutherford, W. F.....................Harrisburg
Rutherford, J. Q. A...................Harrisburg
Root, A. D..............................Bear Lake
Ross, Wm. M..........................Sturtevant
Rutler, John H. ................................York
Reed, A. H...30th & Market sts., Philadelphia
Rhineharк, H. L.....1937 Market st., Phila.
Reeder, M. E..................R No. 2, Muncy
Sharples, Joshua..................London Grove
Stokes, W. P....219 Market st., Philadelphia
Sharples, J. C......................London Grove
Sharples, J. P......................London Grove
Sharples, Thos.........................W. Chester
Sommers, R. M.......................Phoenixville
Swartz, S..........................Spring Forge
Snyder. A. H............................Kulpsville
Solt, W. A...............................Petersville
Moyce, Titus K.................Blooming Glen
Mitchner, J. Walter.....................Glen Hall
Martin, A. L.......(Dept. of Agr.) Harrisburg
Meloney, Geo.....1937 Market st., Philadelphia
Heller & Meez....55 Maiden Lane, N. Y. City
Meredith. W. A.................................Corry
Martin, Eli M........................New Holland
Maxwell, E. Beverly..........Mechanics Grove
Moyce, C. F..........................Millersburg
Miller, J. E...........................Wallingford
Miller, J................................Stony Brook
Shook Bros.............................Spring Mills
Schrack, J. H.........................Wagontown
Smith, S. F...........................Coudersport
Swope, E. S.......................Campbelltown
Smith, S. H..................Muddy Creek Forks
Sieple, I. J...........................York Springs
Saxton, H. W................Granville Summit
Savage, E. A.........................Southampton
Stilson, Geo. (Cry. Pkg. Mfg. Co.).....Chicago
Harper, C. E................................Enders
Harvey, J. F...........................Russellville
Holderman, J. H........................Pottstown
Hamill. Robt...................... Cochranville
Hall. Wm. A.........100 Broadway, New York
Howard, H. P.........................Glen Mills
Harris, Mrs. S. J......905 N. Broadway, Phila.
Harris, D. J.......905 N. Broadway, Phila.
Herr, J. Alders.........R. R. No. 4, Lancaster
Herr, Joel A.......................Cedar Springs
Hay, J. Harris..........................Bellefonte
Burnham, Beatrice.......................... Troy
Brant, Irvin S..............................Reading
Sharples, Benj.........................W. Chester
Thomas, J. P..............................Cheney
Taylor, F. M...........................Reedsville
Thompson, J. I............................Lemont
Taylor, G. K..............................Grover
Thomas, F. G............................Cheyney
Torbin, W. H.........................Gatchelville
Traver, T. E...........................Wyebrook
Urffer, David...........................Pottstown
Vrooman, M. J................................Ovid
Vandyke, O. D..............................Leroy
Williamson, E. C......................Morrisville
Wells, Maj. Levi.....Spring Hill, Bradford Co.

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|---|---|
| Woodside, R. G | Oxford |
| Weiland, Clyde | Linden Hall |
| Waite, J. W | Smith Port |
| Wales, A. L | Corry |
| Wright, P. M | E. Canton |
| Winey, A. L | Thompsontown |
| Worthington, E | Stone Church |
| Wells, F. S | So. Montrose |
| Williams, Joseph G | Oakburne |
| Walter, Edw | W. Chester |
| Westcott, R. A | Glen Roy |
| Willets, F. P | Ward |
| Witler, Robert G | Walkersville |
| Watson, Prof. G. C | State College |
| Wallace, Mrs. Mary A | Ellwood City |
| Young, D. C | Smith Port |
| Young, A. P | Wellsville |
| Yost & Son, I | Myerstown |
| Besley, O. B | Columbia Cross Roads |
| Baldwin, A. C | Kanes |
| Baron de Hirsch | Woodbine, N. J. |
| Buckwalter, J. Y | Lancaster |
| Small, Allen B | Pottstown |
| Snavely, H. H | Lancaster |
| Snyder, W. R | Enders |
| Colegrove, J. J | Corry |
| Cloud, G. M | Kennett Square |
| Conard, Dr. M. E | West Grove |
| Casein Co. of America | Hanover Bank Building, N. Y. |
| Palmer, T | Wallingford |
| Paschall, Joseph H | Brandywine |
| Poyk, Max | 22 Clift st., New York |
| Pearson, Wm | Calcium |
| Reichert, J. H | Scranton |
| Nissly, John F | Mechanicsburg |
| Hait, John D | Bryn Mawr |
| Stokes, H. M | Hanover |
| Gaber, E. L | Lititz |
| McMaster, H. M | Walkersville, Md. |
| Richardson, Wilson | Berne |
| Riegel, Benjamin | 44 North 2nd st., Easton |
| Hull, D. W | Waymart |
| Erk, George | Seelyville |
| Ledyard, E. H | Pleasant Mt. |
| Brubaker, J. F | R. No. 7, Lebanon |
| Wagner, W. F | Harrison City |
| Stevenson, W. E | Burgettstown |
| Buchanan, J. S | Hickory |
| Hamlinton, J. Wilson | Meadville |
| Binkerton, G. W | Allegheny |
| McJunkin, W. P | R. 4, Unity |
| Arthur, J. S | Meadow Lands |
| Hall, H. M., Jr | 208 Shady ave., Pittsburg |
| Schade, F. S | Monaca |
| Dickson, D. S | Bakerstown |
| Hartenbach, H. C | Monaca |
| McKinney, J. W | Monongahela, R. 1 |
| Howeth, J. M | Homer City |
| Poorbaugh, Nelson | Mt. Pleasant |
| Holtzer, W. F | Greensburg |
| Henderson, H. E | Buenavista |
| Moon, H. C | Pittsburg, R. 2, Sharpsburg Sta. |
| Weber, W. F | Pittsburg, Sharpsburg Sta. |
| Madenford, Penn | Womelsdorf |
| Knight, F. H. H | Leatherwood |
| Crooks, A. M | Imperial |
| Van Norman, Prof. H. E | State College |
| Wise, W. S | Meadville |
| Kepple, J. B | Greensburg |
| Lantz, J. F | Glenmoore |
| Hargett, D. H | Frederick, Md. |
| Lindley, H. A | Washington |
| Shannon, R. F | Pittsburg |
| Niederiter, A. W | Marble |

# PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

## Proceedings of the Seventh Annual Meeting

held at

THE MONONGAHELA HOUSE, PITTSBURGH, PA.

January 17 and 18, 1906.

Meeting called to order at 10.00 A. M. by the President, W. C. Norton, at the Monongahela House, January 18, 1906.

The Chairman: The first business will be the reading of the minutes.

The Secretary: The minutes have been published and distributed. All the copies which were printed, 2000, the past year have been distributed ,and I could use a great many more than I have.

The reading of the minutes was dispensed with.

The Chairman: We will now listen to the Treasurer's report.

Treasurer Lantz: I will not have a very lenghty report. I made out a detailed report last night, and I think I left it on my desk in my room. I am very glad I did. I think it would have taken up more time than necessary. The receipts have been four hundred and a few dollars and the expenditures a little over three hundred. The balance in the treasury to-day is $64.11. I want to say that the publication of our last annual report has only cost us $61 and some cents in cash. The job publishing company would have charged us abcut $240. Through the influence of the Secretary the National Stockman and Farmer has set up and done all the job work for nothing, and we have only had to pay for the outside work of the binding of the pamphlet, and in order to show our appreciation for this service, I move a vote of thanks be tendered Mr. Bayard for doing this great amount of work gratis. Motion seconded and unanimously carried.

## REPORT OF COMMITTEE ON STATE FAIR

Chairman Norton: I would say last winter, in which I spent nearly the greater portion of my time in Harrisburg, it seemed to be a new matter to the representatives. They did not seem to understand. They had got the thing mixed with the old State Agricultural Society, and it was hard work to get it through their heads that we are not looking to the interests of the old State Agricultural Society, that we had no use for it, and that we wanted a new organization, and one that would be a success, which we could not secure by taking up the old organization. The old organization has got too much of a stink connected with it. Now, in going through the House and Senate last winter we found, Mr. Bayard and myself, that the representatives as soon as they understood the matter were willing to vote for a state fair. We had the bill prepared, as you all know, and while there was a very small amendment and some suggestions made to amend it in the House and Senate, there would not have been ten dissenting votes against the bill. But when we came to see the Governor (we went to see him two or three times) we could not get any satisfaction from him. Finally when he gave his decision, we found that he would veto the bill on account of the financial standing of the state. WhileI was in Harrisburg the other day the thought occurred to me that there wouldn't be quite as much fuss over the state deposits if we had a little of the money. We have a surplus of $12,000,000, and it was a flimsy excuse that there was no money. There was no changing the Governor. Even Senate Penrose himself tried to argue with him, but he could not do it. He had set his mind he wouldn't sign the bill, and that was the only reason he gave. He said it was a meritorious measure, and the people demanded it, but he couldn't see his way clear on account of the demand for the money for the hospitals and the insane asylums. Those were the two institutions that he seemed to base his argument on for not signing the bill. He could not get it through his head that they could support us with money for the state sentatives said "We will put it through any way." When we came to study the matter over and look at it, we decided that it would be a hardship for the incoming governor to sign a vetoed bill; and we decided to drop the bill where it was. I have no idea but a state fair bill will go through in the next session. The trouble will be with the governor. There is no use getting a state fair commission appointed unless we can have a reasonable appropriation to start that fair with. There were some things occurred last winter I did not like. The old State Agricultural Society officers came to me and wanted to make an appointment, and because we wouldn't accept one of their number, making it binding on us to put one of that number on the commission, they then said they would defeat the bill. We told them to go ahead and do their worst if that was the spirit they were working for—their $2,000 a year. I do not think they can do us any hurt, but I do say I want nothing to do with the state fair that is going to take up the old Agricultural Society. We want a live State Fair Association. We are going to have it or we don't want any. If the breeders here say there should be a state fair committee appointed to go on and look after this legislation in the next session, we will do so, but there can be nothing done in the special session. But a year from now if this thing is managed rightly I don't see why we cannot get the law passed to go through the House and Senate, and the only question will lie with the Governor. I think the postal card system would not be a bad idea. It seems that that scandal connected with the old State Agricultural Society we have got to overcome. We have made up our minds not to have anything to do with it, and we don't want to be connected with it at all as an association. If we do we have got that to fight, and fight from the start. We intend to start clean. We want the united effort, we want the help of every one, not only the breeders, but the dairy people and any one interested in agriculture that is not a dairyman or breeder, and we want the manufacturers. If the manufacturers are with us and the railroads are with us, why the Governor could set himself up against the whole state I could not see myself when these men in Harrisburg were in favor of the bill. I have always felt we needed an appropriation so we could start out, or else there was no use in trying to organize a fair. You cannot organize a fair on hot air. It has got to have something behind it. We want your help, and we must have it. There is no strength in one man. It is the united effort of us all that will do the work.

The Chair: I appoint J. H. Reichert, Mr. Shoemaker and M. N. Clark an Auditing Committee.

Chairman Norton: The next will be a paper by Prof. Hills of Vermont.

# ADDRESS OF PROF. J. L. HILLS

## Feeding Animals.

Gentlemen: Yesterday afternoon I held in my hand a sort of blunderbuss with which I tried to sweep the whole horizon; to-day I have a rifle in my hand, and will address my talk at a single specific proposition—the feeding of animals. That is an old story to the farmer. Animals have been fed from the time of the flood. For several generations this matter has been discussed before farmer audiences. Why should it need re-discussion? For two or three reasons: In the first place, there are many who fail to comprehend the fundamental principles; and in the second place, because this, as every other thing has vexed human endeavor in this year of our Lord. I shall divide my talk into two parts. In fact, it will resemble somewhat a custard pie. There will be a sub-stratum, more or less undigestible; then it will have the superstructure of the custard which is much more digestible, and more palatable. So if those of you who do not care for the straight practicalities will go to sleep I will try to wake you up for the custard part of it.

Up to a comparatively few years ago the science of chemistry has been appealed to more particularly in this matter of stock feeding. We thought of protein and carbo-hydrates, we thought in terms of matter. Of late years another science, that of physics, has been brought into view, and we are discussing this matter to-day quite as much from the standpoint of energy, or force, as from the standpoint of matter. Now, to many people this second line of reasoning is not as clear as the first, and there are those who say, "We have learned what protein is, we have some conception of what carbo-hydrates are, why upset that? Why not lay your stress on those things, and why talk about energy? Why go into this matter from another standpoint? Let us lay emphasis on this thing we do know." There is some justice about that. On the other hand I believe it is well worth while to view these things from different standpoints. Take for instance, the cow. A man who is going to judge that animal does not look at her from the front only and observe her head, whether she has crumpled horns or not; doesn't observe her shape from there. He goes all around, front and rear, and views from every standpoint. In my judgment there is much to be gained by viewing this stock proposition from the dual standpoint of matter and of energy. Our animals, be they of the human or brute creation, are the most wonderful chemical engines devised. There is not one of these magnificent inventors of Pittsburgh or Philadelphia that will ever match the Creator in the matter of the making of an engine. The best of our steam and gasoline engines make use of a very small proportion of the total energy in the coal. You or I or our cows or our horses use a far larger proportion of the energy which we or they get in the form of food. Consider what a marvelous engine this is. It is self-feeding, self-stoking, and self-oiling, self-insulating and self-reproducing. It is a very different engine from any that has thus far been devised by man.

Now, look at this matter from the standpoint of energy and the standpoint of physics, in the long run, in my judgment, is to simplify these problems. It is not at present. Although it is my duty and pleasure both at the university to state these things and teach these things, I haven't begun to accomplish the things and get a clear conception viewed from the energy standpoint as I have from the chemical

standpoint, but I believe that as the work goes on we shall see it in a clear light, and it will work out a simpler problem than has been worked out from the chemical standpoint.

### Energy.

Last May there came to my desk Bulletin 71 of the Pennsylvania Station. I read it over with a great deal of interest, and threw my hands up and said, "Dr. Armsby comes nearer being an iconoclast in this matter of stock feeding than any man I have yet run across." He simply tipped over, to a large extent, a great many of the notions that we have hitherto been setting up. What was the general contention that he laid down there? I want to read it directly. That the value of certain feed stuffs was decidedly lower than had been computed according to the current methods of estimating the amounts of digestible nutrients present. And I said, "Wo is me." Here I and my associates have spent thousands of dollars in calculating these 1292 several experiments based on digestible nutrients.

He says further: "Coarse fodder in particular we found to have much lower values than the concentrated feeds, the relative values of the former as compared with the latter being greatly overestimated in the feed tables in common usage."

A few years ago the world was startled by what Madam Curie and her husband discovered with regard to radium and the radio-active bodies, but what has come from her work and that in many laboratories of the world is rapidly revolutionizing our ideas as to matter. I was taught in my college days about the atom. We feel less certain to-day about the atom than we used to feel. This class of work, the radio-active class of bodies, is changing our views. We don't know, to use the slang phrase, "where we are at." We are ultimately to come at a more sane and accurate measure of things. That is just being done, in my judgment, when we look at this matter from the standpoint of energy. To-day much is in a hullabaloo, not clear and not distinct, but we must unlearn apparently very many things, and learn other things that are more nearly correct. The man who never changes his mind (of course women do often) as new light comes to him is one of the most unsafe men to be the guide of other men. So I trust every man whose function it is upon the institute platform, or any platform, to teach this matter, or talk about this matter of stock feeding, will have an open mind and a receptive attitude as to these newer things, though they be at first uncertain.

However, this does not mean that we are to throw carbo-hydrates and protein into the Monongahela river. We are to still think of them in this transition stage, and I think for myself I shall use protein and carbo-hydrates. I am simply bringing this first substratum with a view to get into these minds this new light.

### Composition of Feeds.

Now, in this matter of protein and carbo-hydrates we still must use them, we must still in this transition stage, I think, consider the chemical side of this proposition. We can't make milk without protein. Every thirty pounds of milk of average quality will carry about one pound of a modified protein in the casein and albuminous and kindred bodies. We must still look at that. And so for the remainder of my talk, which will deal with the more immediate practicalities, the custard, I want to direct your attention to these new materials as we find them in the roughages, the concentrates that are offered us for sale, or which are grown upon our farms. Protein, the flesh former—several other subsidiary functions, but primarily the flesh former. Casein, or curd maker; carbo-hydrates, with several subsidiary functions, but specifically the fat maker and the heat maker. Get those two close conceptions from the chemical standpoint—the flesh former ingredient, heat and fat producing ingredient. Now, in northern New England with our long, cold winters and our short summers, it is difficult for us on the farm to grow a sufficiency of protein flesh-forming, milk-making, milk-stimulating ingredients to make a sufficiency for our cows, and we needs must go into the market for purchase. For those people who can grow alfalfa, which was discussed so ably from this platform last evening, the proposition is a less serious one, but even though you do have alfalfa you must at times go into the market for the purchase of materials to supplement a food, and so it seems to me it is worth our while for the next fifteen minutes to consider advisably the economical purchases. Now the roughages for the dairy animal, it seems to me, are confined to three or four: hay, early cut, the more clover the better, or if you can grow alfalfa, better yet. A friend of mine in our state had been accustomed to say corn was king and clover was queen. And there was an irreverant cuss in his audience, who said, "What is jack and ten spot?" He could not answer. But alfalfa is the ace every trip, and I earnestly advise every one of you who have got lands that are at all adapted to that crop to try it at least in a small way the next year. One way that was advocated here last night seems to me to be nearer the key note in that line than any other. In all New England, in the last two years, we do not find a single permanent success with alfalfa, save in one limited locality, which is underlaid with limestone. Early cut hay, clover hay, alfalfa hay, those will give, however, more carbo-hydrates, more of the heat makers, relatively speaking, than it will of the milk makers and flesh makers. Corn I hold first of our feeding crops, corn in the silo—and I do say emphatically that in this year of our Lord no dairyman can afford to keep house or keep a farm without a silo on it. Lots of them say, "Why, with silage we hurt the milk." I have heard when the silage milk was eaten by the babes it was injurious to them. In Illinois they tried this matter and gave to over a hundred families a quart of milk, and asked those families to critically use that milk, and there were more who said the silage milk was better than gave the non-silage milk the preference. In fact I do not believe the modern silage hurts the milk.

### Apple Pomace.

Some years ago Dr. Armsby's station put out a bulletin on the making of cider. I want to know how many of you can see, however, so far as your cows are concerned the residuum of that cider manufacture is an admirable thing, apple pomace. I am here reminded of a story of a judge in one of the New York courts who was trying a negro woman for mistreating her son. He had her on the stand, and she was going over the harrowing details, how she lambasted the youngster, and the judge said, "Stop, madam, why did you treat this boy in such an outrageous fashion? I am shocked." She looked at him with fine scorn, and she says, "Look here jedge, were you ever the father of a worthless mulatto boy?" The judge naturally pretty nearly fell off the bench, but he collected himself and said that whatever his sins might have been that hadn't been one. "Well, then," she said, "if you wasn't you don't know nothing about the case." Now, there is a many a man when I first talked about this matter of using the apple pomace, who wouldn't take it. If you haven't tried it you don't know anything about the case. Apple pomace silage is good and does not hurt the milk or butter.

### Concentrated Feeds.

Passing to the other side of this matter, in the matter of the concentrates, the Hon. Secretary of Agriculture last night told you something of what the state was endeavoring to do in the line of protecting the dairyman in the purchase of concentrated feeds for their cattle. He stated they have started some prosecutions along these lines. There is to be a conference next spring in New York city, I presume among the stations of the northeastern part of this country, as to what may be done in this matter of the food shortage in the protein contents of certain of the concentrates that are commonly sold through here. Our state laws in many of our states are nothing in this matter. But now while legislation may be and is of decided advantage in connection with this matter of stock feeding, it will not and cannot take the place of intelligent judgment of the individual. Legislation will throw about certain barriers, but it won't do your thinking for you. The station work and station publications are not to lessen but to increase your labors. As I frequently have said, investigation in agriculture is not a staff for farmers to lean upon, but a rod to stir them up with. It seems to me it is worth while for ten minutes to discuss this matter of the relationship of these concentrates to specific uses or their part in stock feeding. On every bag of concentrate sold in the state of Pennsylvania, barring a few specific brands, there must be a printed statement as to its composition in terms of protein and in terms of fat. Now, to the man who buys that bag in this fashion, the printing thereon will not amount to a row of beans. The man who buys with his eyes open, and looks at it, and cogitates about it, and fixes in his mind, the man of greatest observation, who studies the relationship between that statement and the price and the cow, will make far more and better purchases than he who simply buys upon the statement of the agent. I read two or three years ago in the Rural New Yorker a most enlightening article, written by my friend Masters of Connecticut. It was entitled, "The Confessions of a Feed Dealer." He told me nothing new, but I imagine it was new to a good many people. He said when he went into this feed business it was a side issue to another line of work he was in. He was actuated largely by altruistic motives. He thought he could do good to his fellow man and associates and friends by suggesting that this or that feed was the better. He thought he could help his people along that way. He told them cotton seed and linseed, although higher priced, were better values. He had great difficulty in selling them. They misconstrued his motives. To-day he has given it all up and sells what they demand, and sells them as well as the goods very often. Now, while the protein is not, in a slang phrase, the whole thing, still in the present inchoate state of our knowledge it is wise advice in my judgment to suggest that the dairyman fix his eye upon that guarantee, and when he has to buy for dairy stock to make that the main proposition. One cannot in fifteen minutes tell the whole story of this matter. It takes me a good many days in my class rooms. But that is the main proposition. That does not mean because cotton seed meal carries 43 per cent protein, the highest of any, that doesn't mean that is the sole and only thing to buy. It is too concentrated, too heavy. Second, the economical character of the food ought to be considered. Distillers grain and things of that kind, which are flaky and light to open up the ration, are better adapted to the feed than the bulky concentrate for the cow than are these heavy firm materials, like cotton seed and linseed. When I am talking about this matter I usually go out of my way to throw a boquet, as it were, to linseed meal, because though not so rich in protein as one or two other materials it is a great feed. It seems to me that the American public needs to be warned of one thing above everything else, and that is as to the true character of these proprietary mixtures known as the oats feeds. A little Jew boy was standing in front of his father's store one day, and he came in and he said, "Father, there is a lot of little birds out in front there saying cheep, cheep, cheep." He says, "Iky, go and get those birds and put them in the window so they may say cheep, cheep, cheep to people." That cheap, cheap, proposition to many of our ill informed dairymen is the main proposition.

### An Economic Crime.

Our state pays three and one-half million dollars a year for purchase of foods from the West, and a million and a half of that sum is paid for corn meal. And yet the last census and the census of 1890 showed of the two states at the head of the states of the Union in the matter of the number of bushels of corn to the acre are New Hampshire and Vermont. Yet Vermont farmers send a million and a half dollars a year to Kansas to buy concentrated sunshine. Purchase of corn meal or the purchase of oats for the feeding of dairy cattle is an economic crime. The growing of corn and leaving it right up on the stalk, and the putting of the whole thing in the silo is a pre-eminently better way to treat that plant. They tell a little story of a man who went down into Boston one day and went into one of the cheap restaurants, and he called, among other things, for bread and cheese. The cheese was made from skim milk. He reached over to the butter, and he spread it on top of the cheese. And he said, "Come together here, you two, what poor fools have separated you?" Now, man plucks off the ear from the stalk where God placed it and puts it in the crib, and takes that ear and those of his fellows to the miller, and pays him a tenth toll to grind, and then takes it back again and places that corn meal, that stover, before the cow. That does not, so far as the cow is concerned, add one jot or one tittle to the digestibility of the

matter or to the energy, but the cow, as many an experiment station and many a practical feeder has found, the animal does poorer work on those two when they are divorced from each other than when they are put together. With all reverence let us repeat the marriage ceremony, "What God hath joined together, let no man put asunder." We fed two years with several of the different concentrates, and our cows told us the story. It is not what the chemist says. Hominy meal is rather better than corn meal for milk purposes, but at the prices at which it is ground in New England of late years it has not proved an economical concentrate to buy, as some of the richesr materials as a milk maker.

A Member: What are wheat screenings?

Mr. Hills: That is simply a nice technical term for weed seed. It may be fed to sheep but their digestive powers may be destroyed, and destroyed to quite a large extent.

A Member: Are the screenings ground?

Mr. Hills: I am not certain. A weed seed where every one is smashed is not going to do any harm. The danger in this matter that we cannot be sure those seed will not pass through the animal and sprout. If we can then there is no reason why digestible nutrients in every material should not be utilized.

### The Cow a Balancer.

Speaking about a balanced ration. It does not seem to have entered into the conception of man very much that the cow is under a rigorous law to make a balanced ration herself in her milk making and eating for the feeding of another animal. She has to balance that ration. She cannot help herself, and the question of why you should feed protein and why you should feed this other feed as long as you can balance them rightly is governed by the fact of the work the cow has got to do herself. The Governor is entirely right, that in 30 pounds of milk the cow has got to put a pound of protein, and if you do not give her that protein to put in there, she will take it right out of herself or give you less milk. She is a fairly good cow of the purebred type, she is very likely to pour herself into that milk pail. I have heard it said the cow is like the Arkansas jury, find for themselves first and for you second. That balanced ration is not man's conception, it is made by the very animal herself. Another point about that balanced ration among dairymen. In former years that balanced ration was governed on a rigid rule, but the true balanced ration is made out of rubber instead of iron. What is good for one is not good for the other. These standards are not rules, but guides, not cast iron, but India rubber, and to be interpreted with intelligence and with judgment.

Gov. Hoard: When you strike thirty cows you strike 30 rigid rules. Each cow stands rigidly to her own rule. There was an old German who said: "The state pays me $4 a day for institute work. I don't know that I am making anything. The cows do better when I can breathe on those cows." I don't believe it was that man's breath, but it was his careful oversight of those animals. He knew every one of the animals, their needs and their desires and their ways as he knew his children. That is the successful man in dairying.

Mr. Reichert: Is it your idea the farmer should, in buying these concentrated feeds, be governed entirely by the price of protein contained? For instance it is said there are 860 pounds of protein in a ton of cottonseed meal which would make the protein costs 3½ cents a pound. Now, is that your idea? There might only be a dollar's worth of fat in the cotton seed. I might take another feed in which there would be $22 worth of protein in a ton and $4 worth of fat, and the total value of the feed would be more, counting the fact and protein, than the other that has only $24 worth of protein? Is it your idea when you buy concentrated feeds that would be safer to take into consideration simply the pound value of the protein in the feed?

Mr. Hills: Twenty years ago I bought for a certain lady a ring which contained a ruby and a diamond, which I am glad to say she still wears. Two years later I bought for her another circuit which was of gold, and which she still wears. Now, in that second purchased I paid for just one thing, gold. For the first purchase I paid for three things: I paid for gold, for the ruby and for the diamond. Now, in that first (chronologically engagement ring), how much did I pay for the ruby, how much for the gold? I paid just one lump price. You can't separate. And so in the case of cottonseed meal. There is no such thing as buying protein per se on the market by itself, or fat by itself or carbohydrates by itself. We can't in my judgment apply any commercial price safely to a digestible protein.

A Member: Is it worth while to make molasses to feed on the farm?

Mr. Hills: I think for certain stock feeding, particularly for working horses and things of that kind, the molasses has distinct merit. But whether it is worth while to make molasses on the farm I am not at all clear. We do not have it up our way. I should think for the horse it would be worth while; for the cows I am not clear.

A Member: Have you had any trouble, any cows failing to breed by feeding cottonseed meal?

Mr. Hills: I do not know that there is necessarily any relationship there.

Gov. Hoard: Is it your opinion that feeding has anything to do with the abortion?

Mr. Hills: I cannot conceive that it does.

President Norton: The next will be a paper entitled, "The Merino, Its Utility and Its Development," by John P. Ray, of Bloomfield, N. Y.

## THE MERINO

### John P. Ray, East Bloomfield, N. Y.

The subject of my remarks—the Merino—does not refer to any mushroom breed clamoring for public favor—the offspring of a night or of a score of years. The stretch away of many centuries is all her own. The facts surrounding the origin of Merino sheep are locked in the chambers of antiquity, and no man holds the key to unlock the mystery. This opens a wide field for speculation and romance. When Adam was appointed a committee of the whole to pass upon and name the kinds of animated nature the verdict was "very good."

Merino sheep more than any other conserve the comfort and well-being of man.

They know no North, no South, no East, no West. The world at large is their empire. Wherever vegetation grows and civilization obtains a lodgement, there they find a congenial home. They possess the inborn capability of being developed into any type that a country may need or fashion or taste of man dictate, and this is a great quality to possess. Their fleeces enter into fabrics for which there is no known substitute among textile fibers. Their sociability or love for companionship induced them to flock together. In length of days and years of usefulness they are the antediluvians among sheep. Were Noah's two rams an Infantado and Paular respectively? Tradition has it that these sheep trace from Spain through Italy and Tarentine into Asia Minor. Were Job's 14,000 sheep Merinos? The record makes no mention of their lack of herding quality. Merinos are the only kind that herds well. What other breed after being led into green pastures and by the side of still waters would lie down in serene repose beneath the shade of a cedar of Lebanon and inspire a man to write that immortal twenty-third Psalm—"The Lord is my Shepherd, I shall not want"?

I have known a lot of Merino breeders who were good whole-souled men to be trusted with gold uncounted. The shepherds on Judea's plain were deemed the fittest among men to witness the rising of the day-star of hope and hear the heavenly benediction "Peace on earth, good will to men." But why speculate? We know that they are the oldest breed of domestic animals and this is glory enough for you and me, my brother.

The richest legacy that has come down to us from the ancient Roman Empire is Merino sheep. Well did the haughty and proud Spaniard know the value of these sheep and what it meant to a nation to monopolize the breed and the fabrics made from their fleeces. Then were they the sought after by kings, the envied by princes. To be clad in Merino fabrics was a prouder distinction than to wear purple and fine linen. The Spanish nation was not true to herself or loyal to her brother man. Over against her record as a nation were written the words "Mene, mene, tekel upharsin." Her rule and sway was broken and her greatest good divided with others.

If deeds are measured by results, and institutions by the amount of human good, comfort and material well-being which they promote, then the bringing of the Spanish Merino to our shores by Humphreys, Jarvis, Crowninshield and others should place their names high on the scroll of fame as public benefactors. And scarcely less should we esteem the men like Jarvis, Atwood, Blakeslee, the Nettletons, Rich, Beedle, the Quakers of Lebanon, N. H., and Bailey and Potter of Rhode Island, who preserved the Spanish blood pure from its importation all through the vicissitudes which intervened from the beginning of the last century down to the decade of 1840-50, when they engaged the attention of master breeders like Hammond, Sanford, Robinson, Stickney, Elitharp and a few others who began the improvement carried on by their successors which has given to the world the marvelous American Merino, the greatest wool-producing animal the world has ever seen or will see, and established a blood line that can improve all other breeds in quality and amount of fleece. Possibly there may be a few flocks in the land of Merino extraction whose blood has not been mingled with this strain, but they are unknown to the speaker. The successful breeder employs methods and applies principles that may well be imitated by all sheepmen, both as to care and keep and judicious matings for result.

## The Breeder.

This brings us down to the three heads under which we propose to discuss the subject in hand: The breeder, his material, and the principles governing his operations. Breeders may be classified as good, bad and indifferent. The good breeder has his ideal and no influence swerves him from his purpose. He shapes and moulds his animals as the potter does the clay, and establishes a blood line that can improve the breed or kind. The bad breeder is one that has no ideal, no fixed type in mind. He goes hither and yon and is swayed by every influence that crosses his pathway. He has everything in moderate type and nothing that stands for quality. The indifferent breeder is one who buys a strain of blood or distinction that he fancies. will be popular. He has no knowledge of quality or blood line. With him a sheep is a sheep. He mates with no other purpose than to preserve the blood and breeds scalawags that are a stricture on their kind.

Now who is qualified to be a good breeder? Not everybody. Great breeders, like great artists and musicians, are to the calling born. By this we mean that they must possess natural traits and gifts that fit them for their mission. He must have an admiration for animals that nothing can abate, love their companionship, and be happy and patient while ministering to their wants and comfort. He must readily individualize and discern that every animal has a form and feature peculiarly its own, and grasp as by intuition that indefinable something known as quality. He must be an idealist and fix in his mind's eye the typical specimen, and have the creative genius to group his material and produce the specimen. Education and experience will give him ripeness for his calling and give expectations of better things farther on.

## The Breed.

Having a call to the work the first move is to select the breed—not breeds; one is enough. In this he should be guided by individual taste, environment and prospective demand. Having settled this point get acquainted with the breed or kind. Study their history. Go up one side of the animal and down the other. Lay hold with a tight grip of the great essentials of constitutional vigor, size, form and fleece qualities and of what is of scarcely less importance—fancy points that give finish and attractiveness to the animal. Visit flocks of note and character. Ask a lot of questions, express very few opinions, and saw a lot of wood as the saying goes. Visit the fairs and watch the show ring and find out if possible the whys and wherefores of the judge's action, more especially if he is a noted and successful breeder of the kind. Such men are judges and their work educational. Do not buy until you have confidence in your own judgment to select, and begin to paddle your own canoe right from the start. Pin in your hat the motto that the best are none too good and the best are the cheapest. Better start with a few specimens and start right

than to start with more that you have to hoist into rank by years of breeding.

Strive to get the other fellow's great-producing ewe or ewes. Every flock has its mother queen. Several times we have purchased lots of ewes ranging from six to ten, and found that some one ewe in each lot was worth all the others as a blood line to improve or add to the standing of the flock in general. Seize and hold fast the old maxim that like begets like or the likeness of some ancestor as the law of transmission and inheritance, begetting like when the potency of like types in sire and dam overcomes the law of atavism, or striking back, and gives mould to offspring like some ancestor when this is reversed. Inscribe on your banner "The stock ram is my lever and he counts 60 per cent of my plant."

## Some Experience.

It may show a lack of delicacy and do violence to the law of propriety to tear some leaves from a chapter of personal experience, but we are going to do it just the same. In 1881 we had two sons of Bismarck at the head of our flocks, one of our own breeding, the other purchased of Mr. Burwell. These were quite liberally patronized by outside breeders. Among them was Mr. Jas. R. Worthington, who bred five ewes to each ram. The conditions were that we were to choose a lamb from one ram's get, and decide in advance which ram's get we would draw from. Prince Bismarck was our favorite and of our own breeding, and we named him. In each bunch was a very choice ewe lamb. We liked the lamb got by Towando, the other ram, best and Mr. W. preferred the one we were entitled to take and an exchange was made. For two succeeding years he bred ten ewes to Prince Bismarck, we to have our choice of each crop of lambs. From the first crop we selected a ram lamb which we named Dudley, and that later proved a first prize winner at our State Fair. Our next selection proved to be a sister to Dudley, that won first and champion at our State Fair when six years of age. When preparing the pedigrees of these sheep for registration we found that the Towando ewe was out of his ewe Madam Dudley No. 21 and that the other two were out of No. 60 and she out of Madam Dudley, and that we had dipped deeply into his great-producing ewe family. Towando ewe 159, bred to Martin's Block, produced Don Dudley. Dudley is a connecting link in the chain of sires between Mr. Peck's young Bismarck ram, the only promising one known to the speaker, back to the great Bismarck. The Prince Bismarck ewe No. 195, bred to Prince Dudley, a grandson of Dudley and out of Don Dudley's dam, produced Rex Dudley, which proved a greater ewe sire than Don.

In 1899 on account of a severe illness we were obliged to sell our flock of sheep, that represented the work of nearly forty years, steady pull. When health came back to me again the love for the Merino came back also, and red-hot too, and when laying the foundation for flock No. 2 we were in possession of some facts that were valuable aids to us. We knew that all our improved American Merinos were descended in the male line from Sweepstakes, Comet and Eureka and that our most remote blood lines were more or less of kindred strains. So we sought divergent lines of a common type and type bred. We made our selections from Vermont, New York and Michigan flocks. From Mr. A. A. Wood we secured a ewe we sold him with our flock in '99. She was bred by Geo. N. Payne, Bridport, Vt., and got by Don Dudley. This ewe we considered the best ewe lamb we saw in Vermont that trip. My intimate friend of many years, Mr. T. J. Wynn, Lakeville, N. Y., had a ewe that was the highest scorer in the standard register; had clipped 25½ pounds and would weigh 152 pounds in full fleece. She was by Rex Dudley, dam by Kaiser, bred by us, and a son of Prince Bismarck, dam by Custer, a son of Bismarck. Kaiser was one of the best show rams bred at Pine Ridge. He beat the famous ram Jay Eye See at our State Fair. His full sister was the second dam of ram No. 179, J. P. Ray, known as Gold Bug, Jr., which has been held in such high esteem in Illinois and Ohio. This ewe we considered indispensable to our success, but buy her or trade for her we could not. We could only get her as a partnership ewe to breed on shares, each to own a half-interest in her progeny. We did not know of a single ram that met our ideal as a sire and show ram. Mr. Worthington, previously referred to, had a yearling ram of his own breeding, now known as Don's Champion. He was by Champion, son of Block, dam granddaughter of Don Dudley, and was a member of the Madam Dudley tribe. This ram was the most phenomenal specimen we ever saw on the score of massive folds and weight of fleece, clipping 43 lbs. 3 oz. in his three-year-old form, an even year's growth. He lacked somewhat in head, leg and style of fleece.

We recalled the facts that two removes from Bonaparte, another ram of this ilk, Mr. Burwell bred Bismack and Stub, and Mr. Crane Eureka 3d, and that from Fremont, Jr. Mr. J. T. Stickney bred Centennial and Stickney's 146, and that Kilpatrick, a large, coarse, heavy-boned masculine ram, was the corner-stone upon which L. P. Clark builded. This knowledge led us to desire an interest in Don's Champion, which we could secure only as a most generous gift from Mr. W. From this ram and the Wynn ewe was bred Bonanza, which Wynn & Bell won first and champion on at St. Louis in aged division, class A; and from the same ram and the Payne ewe was bred ewe No. 2, and from Bonanza and this same Payne ewe was bred Don's Rival, which won first and champion in yearling division and Grand Champion of all ages in class A, ewe No. 2 and Don's Rival winning ewe's progeny prize also.

Our apology for indulging at such length in recounting personal experience is the wide dispersal of the blood of Don Dudley and its world-wide popularity, and the great quality and show-ring form of others, and to emphasize the fact that the best breed the best, and the importance of the blood of great sires and producing dams in improving a race or breed.

## The Dam.

While we place so high an estimate upon the blood of the producing dam we know of no feature of the breeding problem that demands closer scrutiny or wiser discrimination. Every observing breeder knows that among matrons that throw individuality in their produce there are two distinct classes, the positive and the passive; the positive possessing individuality by right of inheritance and capable of enriching a blood line in volume and momentum; the passive perhaps lacking in both quality and breeding, serving simply as a channel through which the sire throws his type, yet unreliable as a breeding-on force. I cannot illustrate this point more forcibly than by taking two entire sons of the mighty Electioneer, which made the name of Leland Stanford famous the world over as a trotting horse breeder: Palo Alto and Chimes, the first-named with a trotting record of 2:12¼, and Chimes, that never could take a record of 2:30, unless he was capable of it in his two-year-old form. Palo Alto was a failure as a sire of speed. Chimes ranks great among great sires and is the greatest of his sire's get. Palo Alto's dam, Dame Winnie, was by Planet, a Thoroughbred. She could not trot, had no trotting inheritance and could not impart the trotting gait or trotting instinct. This she left to Electioneer. She may have given Palo Alto lung capacity, texture of bone, courage to speed fast. Chimes' dam, Beautiful Bells, was by The Moor, a Clay, second dam by Bald Chief, a Mambrino, 3d dam by Strader's Cassius M. Clay Jr., 4th dam by Abdallah, sire of Hambletonian, trotting-bred for generations.

In a prospective sire we want individuality and breeding in the two currents that compose his blood line—great sire and great dam. Don Dudley transmitted his own type to both rams and ewes; Rex and Kaiser that of their dams. Hubbards' Leader had objectionable characteristics that were not found in his sire, Jason—his dam had them. This ram got more spotted noses and black feet than any other ram I ever saw. The dam of Burwell's Hercules, son of Bismarck, had a straight, wiry fibre. This ram did much to destroy the beautiful highly-crimped and lustrous fleece imparted by Bismarck. I would not buy a ram without personal inspection and a thorough knowledge of sire and first and second dams, and as many more as could be reached.

### In-Breeding.

Is in-and-in breeding a correct practice to follow? We answer yes and no. Safe with wise selection and a mighty lever for improvement carried down to the danger line, and a powerful engine for destruction carried beyond that point. Many are the one-time noted breeders who have plunged headlong into that pitfall. They became giddy over success and were too proud and narrow to recognize merit in other strains. They harped upon concentrated blood for potency, forgetting that type was the measure of individuality and that type depended upon type breeding. With how close relationship is mating admissible? Never with sire and daughter, mother and son, or full brother and sister. If conditions seemed to demand it I would mate half brother and sister where the dams of each were of remote blood, and the progeny of half brother by the same sire whose dams were remote from each other. This is a favorite cross with me. Some strains will bear more inbreeding than others. The Wilkes strain of trotting horses is conspicuous in this respect. To my mind the greatest danger that lies before American Merino breeders is the kindred blood of all our flocks.

### Violent Crosses.

Are so-called violent crosses dangerous and unscientific? No. What are violent crosses? The mating of a fine-fleeced ewe with a strong-stapled ram, a small ewe with a large ram, a plain light-fleeced ewe with a wrinkly, dense, heavy-fleeced ram. Go beyond your ideal in a ram in the object sought for the first cross and to your ideal for subsequent crosses, and stay there. This is the cross-lot route to the goal.

Is uniformity in a flock the test of a breeder's skill and a measure of the value of his blood line? No, uniformity is but another name for mediocrity. The blood that improves a breed comes from the flock of the breeder whose motto is good, better, best. Never use a ram more than two seasons on the same ewes if it can be avoided. Who ever saw the third crop of lambs from same sire and dams that were equal to the first and second crops? If the nick is great use a good son and then go back to the old ram. Who ever saw a really great ram that had a full brother a year younger that was his equal? I never did. I killed a brother to Don Dudley for mutton (and it was as good a fate as he deserved), and sold a full brother to Kaiser for $2.50 to be slaughtered. Great are the mysteries of the breeding problem!

We have taken the American Merino as a special subject for discussion because he represents one of the highest achievements of the breeder's art, and because the family should be preserved as the fountain-head to be drawn from for fleece improvement, and because the principles involved in his successful breeding apply to all breeds and kinds of domestic animals. Many long centuries have intervened since One queried "How much better is a man than a sheep?" Then put the man behind the sheep and be true to your own manhood and to your brother man. Let your name stand for all that is moral, honest and upright, and let your methods and practices be an open book, read and known of all men. If he who makes two blades of grass to grow where one grew before is a public benefactor, how much more is he a benefactor who enhances the meat or wool-producing capacity of a breed. Verily he should rank among princes and not among mean men. "But," says one "are all these rules to be observed in successful sheep breeding, and are the principles laid down inviolable?" We answer yes, and more too. In these strenuous days of heroic endeavor, when success is measured by marvelous achievement, every detail that contributes to the end becomes an essential. I pity the man who has no ambition to stamp his name and impress upon something that will benefit his fellows. Such a one is a weakling and unworthy of true manhood and his generation.

### The Future.

One word more and I am done. I believe as surely as the sun rises and sets in his course that the Merino is to come back and claim his own. For more than three-fourths of a century he was our national sheep. The forces that drove him from his birthright, free trade and shoddy, were unnatural, abhorrent and forbidding. For fleece production he stands out separate and alone. In hardiness he has no rival. As economical mothers of mutton lambs when mated with that object in view they challenge any and all breeds. I believe that a careful survey of world-wide conditions warrants the belief that a long period of prosperity lies before the American sheep farmers. So care for the sheep and kill the dog.

Gov. Hoard: You are proceeding on the line that the type you are after is on the male side?

Mr. Ray: Always, it cannot be otherwise.

Gov. Hoard: I wanted to know why you don't use the sire on the same female more than two seasons. That question of nicking is something clear back. I have got a Guernsey bull that nicks most splendidly with the majority of my herd, but I have six females that he don't nick with at all, and he didn't get me but one calf from those six cows, and that bull couldn't do his work with those cows right. I keep another bull, and I am trying to see whether they will nick with him. I can't find out in my course of breeding that this law you speak of applies.

Mr. Ray: I do not know that it does apply with cattle.

Gov. Hoard: I am interested to know if it applies anywhere.

A Member: Does a great ewe ever follow a great ram, both by the same sire?

Mr. Ray: In this case it seems to be an exceptional one.

Mr. Norton: Does the female throw herself through the sons and daughters or both?

Mr. Ray: I don't know, but all great men have great mothers. Isn't that so, Governor?

Gov. Hoard: That is what ails you and me.

Mr. Norton: In the Jersey family we have a cow that never produced anything in the female line worth keeping, but her sons were good.

Mr. Ray: That is often the case. We find it so with some sheep. They never produce a good ewe. There is a great difference in rams. There are mysteries in these breeding problems we have no information on.

Dr. Pearson: Kill the dog and save the sheep. I think that is one of the most important things we can consider with relation to the sheep interests. I propose our resolution committee draw up a resolution on this question of legislation concerning dogs, so we may be on guard regarding that important matter. Seconded and carried.

Recess until 2:10.

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Meeting called to order by the Chairman at 2:10.

The Chairman: The first thing on the progrom is the report of the Auditing Committee.

"We have audited the accounts of the Pennsylvania Live Stock Breeders' Association, and find the receipts last year were $432.82; expenditures $366.71, leaving a balance in the hands of the treasurer of $64.11."

It was moved and seconded that the report be received and filed.

Resolved: That the Pennsylvania Live Stock Breeders' Association favor the inspection and licensing of stallions kept for stud use and the issuance of certificates showing their breed in the general manner that has been found so beneficial in Wisconsin.

Moved and seconded the resolution be adopted. Carried.

Resolved: That the Legislative Committee be instructed to make an investigation in regard to the dog laws of Pennsylvania, and to endeavor to secure the enactment of a law which will insure needed protection for sheep.

Moved and seconded it be adopted. Carried.

Resolved: That the Pennsylvania Live Stock Breeders' Association hereby endorse the bill H. R. 34, introduced into the house of Representatives by the Hon. H. C. Adams of Wisconsin to increase the national appropriation to the agricultural experiment station and request the representatives in the Senate and House to use their best efforts to secure its passage.

RESOLVED, That the Secretary be instructed to send a copy of these resolutions to the Hon. H. C. Adams, the Hon. James Wilson, Secretary of Agriculture and to each senator and representative from Pennsylvania.

Carried.

Report of Nominating Committee: The committee ,after taking this matter over have come to the conclusion it is not best to make any change in the officers for the following years. They present the following names for officers, directors and committees for the following year:

### Names of Officers and Committees.

President, W. C. Norton, Aldenville; first vice-president, Dr. Leonard Pearson, Philadelphia; second vice-president, M. P. Shoemaker, Greensburg; secretary, E. S. Bayard, Pittsburg; treasurer, J. F. Lantz, Glenmore.

Executive Committee: W. G. Powell, Shadeland; M. N. Clark, Claridge; D. Norman App, Selinsgrove; William Berry, Washington; Geo. C. Watson, State College; James Blair, Hartstown.

Legislative Committee: Dr. Thomas Turnbull, Allegheny; H. W. Comfort, Fallingston; R. L. Munce, Canonsburg; J. H. Reichert, Scranton; S. E. Nivin, Landenburg; Henry Palmer, Avondale.

Committee on Transportation: T. E. Orr, Beaver; Dr. J. Cheston Morris, Philadelphia; W. F. Shrum, Adamsburg; Jos. T. Fleming, Belleville; J. Grier Dain, Malvern.

Committee on Fairs: W. C. Blark, Mercer; Jas. Blair, Hartstown; J. L. Henderson, Washington; J. D. Detrich, Flourtown; L. D. May, Granville Center; W. E. Perham, Niagara.

It was moved and seconded that the report of the Committee on Nominations be accepted, and that the officers nominated be elected.

Unanimously carried.

President Norton: We must have the help of every one that is interested in the breeding interests of this state to accomplish our purpose. At any time we will be glad to have suggestions from any one interested in the live stock interests of the State of Pennsylvania. I will say this for myself, I will try to do my duty so far as I know how. At any time, as I said, that we can be of any service to you you certainly will be of service to us—we want you to let us know.

It was recommended that the following gentlemen be appointed to act as a State Fair Committee: Messrs. Norton, Pearson, Reichert, Shoemaker and Bayard.

Chairman Norton: We will now listen to a paper by Gov. Hoard.

# ADDRESS OF GOV. HOARD.

Before starting in on my subject I have a number of sheets here which are the tables of the cow census taken in Ohio, which was published in Hoard's Dairyman last April, and I want to spend just a few minutes talking about this work. I have been taking these census and have spent now nearly three thousand dollars in taking them in different states in the Union, employing the most expert men that I can get. They have to be men of exceedingly good judgment in order to supplement the lack of knowledge and judgment which the farmer has. I take invariably the men who have furnished milk for one year at a creamery, in order that you can have the creamery back ground to fall back upon to determine the amount of cash and the amount of milk, and the census taker investigates the farmer, the number of cows, the way the man handles the cows, how he stables, etc. He goes to the creamery and gets the return in cash, and he divides the one by the other, and the quotient is irrevocable. Then they kick and declare it is not right. But then they are answered by saying, "Well, you furnished the facts; if you lied then there is no recourse. Now, this was evident to me, that there was a terrible waste going on because of a lack of knowledge all over the United States in dairy work. In 1886 I caused to be taken a cow census of the town of Ellisburg, New York, the second dairy town in the United States, containing 5,280 cows, 300 dairy farmers all at work in the cheese factories. Mr. Jenkins took the census at an expense of about $500, having the entire summer in hunting out the work of every individual cow, taking the amount of food that she consumed, pasturage at $9.00, and summing it up, and going to the cheese factory, and learning what she would earn, and then holding up the mirror to the patrons and the farmer to look at it, and brought the farmers of Ellisburg in debt $25,000. It seems the feed the cows had consumed would have sold at the local market for $25,000 more than the cheese factories returned. That created a great deal of consternation in the town of Ellisburg. In two years from that time he went and took another supplementary census and found there had been a remarkable revolution in the economic progress of those people. From that time to this that foolishness has died out in the town of Ellisburg. But it is all over the country. I have had about a hundred herds taken in Pennsylvania; fifty herds taken at Melrose; fifty herds taken out in another portions. This census was taken in Ohio, and here are various columns. The first is number of the patron. No man's name is given, but every patron can have his number if chooses. The number of cows, the estimated cost of the keeping, number of pounds of milk per cow, return from the creamery per cow, number of pounds of butter per cow, profit or loss per cow, received for $1 worth of feed, average price of milk per hundred. Now, the column that will interest you most is the profit and loss per cow. This reckons for every dollar's worth of feed. In that column of figures below $1.00 represents the loss—that is the difference between the figure and $1.00 is the loss. For instance No. 2 the return for $1 was 95 cents, and the loss was five cents. Another one 66 cents, loss 34 cents on every dollar, and so on. Now, you would be perfectly amazed at the lower economical skill and judgment of the men who are keeping cows, the number of men. Now, before I start my talk this afternoon, which is based partly on a lesson in cross breeding—I want to give you some calculations worked out from the recent cow census taken in Minnesota. I want this thought to underlie all you hear from me afterwards, taking it as a two foot rule in your pocket to measure things by. You know there is an old saying that every man gives of his own measure, that a man who carries a two-inch measure gives from that standard, another man a two-foot measure gives that much more. Every man comes to his task, every man comes to his cow, every man comes to his fellow man, every man comes everywhere by that power of measurement that he has established in his own mind. At the close of the Minnesota cow census which has just been finished in Hoard's Dairyman I divided the patrons into two classes :the readers and the non-readers. I became wonderfully impressed in my investigation and study with the fact that the power of every man over his own fortune in this business depends upon the attitude, the way he opens his mind, the manner with which he receives impressions.

### Readers vs. Non-Readers.

The question of whether he reads or not. Out of the 100 patrons 63 are readers of agricultural papers and dairy papers or both, and 37 do not read. Now, let us see what that classification has to do with their fortune. The readers receive for each dollar's worth of food consumed by their cows $1.38, and the non-readers receive only 87 cents. The former class receive a profit of $10.00 per cow, and the latter a net loss of three dollars per cow. Think of a man struggling and struggling and working and working in that way. It is too bad, isn't it how the state of Minnesota suffers, how the community suffers, how the man suffers, and do you wonder that Christ said to Jerusalem, "How I would have gathered you as a hen gathereth her brood under her wing, but ye would not."

I was interested to know what the total return from the 100 herds there was by adding the amounts together. I found it to be $30,280.00 and the cost of feeding $25,066. This made a net profit of $5,152. The question came to me: Supposing all the herds in the hundred were as good as the best, and there is no just reason why they should not be, what would the returns then be? In calculating upon this basis I found the returns would have been $57,244 instead of $30,218. The cost of food would have been $28,168 instead of $25,066, over $3,000 more, but a net profit would have resulted of $31,076 instead of $5,152. In like manner I took the poorest herd and here are the results. The total returns from the creamery would have $14,486 instead of $30,218. The cost of feeding $25,150, a little more than actual cost for the 100 herds reported. If all the herds had been like the poorest there would have been a net loss of $10,664. On the other hand if there had been a community which had 100 herds equal to the best the patrons would have marketed their grain at a profit of $31,056. Now, it is very hard to get the average farmer to see the tremendous effect that this economical talk has to do with him and his fortune. I do not know the reason why except that it is his head is submerged. I heard an old story of an Irishman going through a piece of woods in Wisconsin, and a man sunk in the quicksand. He rushed over to a Yankee house near by and he says, "Come over here, for the love of God, here's a man sunk in the mire." And the Yankee says, "How far is he in?" He says, "He is in up to his ankles." "Well, just let him get out. Wait until he gets up to his neck." "Yes," the Irishman says, "he is in the other end first." That is what is the matter—it makes a difference whether he is submerged head first or feet first in the morass. And if we could only get the average agricultural man to take time to think and read, to get time to stop, what would be the result? I don't suppose we will have time to ever do very much with the present generation of farmers. The only hope I have is the young men coming. If I can get the boys turned that way, get them to think, get them to take in these ideas in the common school, and get them to know what the terminology of agriculture means, so when they meet it in agricultural reading they will understand it, it will do more for the future of farming in the United States than all the colleges in the world. Now, you will say in the question of agricultural education I am reaching further. The boy that is to do the farming, that is to be. You say it is impracticable and a whole lot of theoretical schools. Let me give you one instance. I had a German farmer that has been to work for me for ten years at my home place. He takes care of my property there, and my horse and stuff. One day I was out on the farm and I had a piece of ground that was acting refractory and stubborn. I was puzzled with it, I says, "John, what is the matter with that land." I was surprised to hear coming out of that old German farmer's lips the words, "That land got no humus." I said, "John, what do you know about humus?" "Das learn in die schule." "What school, John?" "When I was a kind." And he went on to say that humus was decayed vegetable matter, that it was plant food, that it served to hold the moisture in the soil, and he says, "Without the moisture the plant cannot grow," or as he says, "The plant drinks, it don't eat." That German farmer peasant had been better equipped in his childhood with the science of agriculture than 99 out of a hundred of American farmers to-day fifty years old. (Applause.) Now, who did that for that German farmer peasant boy? His government did it. His government had the practical understanding and ability to look away down to the roots of things, and see that the kinder school, the child's school, shall acquaint the child with the meaning of the terms. When I started in Hoard's Dairyman the feeding department questions and answers, I received thousands of letters from farmers all over the United States, what do you mean by the terms you use? What do you mean by protein, carbo-hydrates, nutritive ratios? These men were not without brains, these men were earnest thinking men, but their government, their state, had not done its duty by them. It had never taught them the meaning of the terms they were obliged to meet in agricultural study and reading, and of a necessity it was to them like a foreign language. There were no equivalents in these words I could find. I had to use the words, and so I put a glossary up there at the head of the department, a little dictionary explaining the meanings of all these terms that I had to use in agricultural chemistry. I got hundreds of letters thanking me for the information, for these things were made plain to them. That is one reason to-day why farmers do not read more; it is because their common school has not equipped them with the information that they are justly entitled to. It is not because they have not good brains. It is because the system of education throughout the United States is a wrong system. It is reaching for a higher education, but God knows there is no such thing as higher education. All facts and all knowledge are correlative, co-related. The words higher education is a misnomer. It has no business in your vocabulary or mine. The word to use would be a wider education, not higher. There is no altitude in education, it is width. So you see if a man occupied a foot of knowledge the thing for him to do is then to occupy another foot, and take in a wider range of judgment and understanding. Now, what effect has that had upon our country? From the Atlantic coast to the Rocky mountains the pathway of the agricultural farmer has been full of destitution and destruction. I can go into New York and Pennsylvania and Ohio to-day and find farms that I would have been obliged to pay $100 an acre in 1868, and I can buy them to-day for $30 and $40. What means that tremendous loss to the state? Lack of knowledge has cost New York in those years fifteen hundred millions of dollars in the decline of her farm values. Do you see what this means to the well being of a state?

Now, what I have to say to you this afternoon is on a line of "Some Things in Cross Breeding."

# SOME THINGS IN CROSS-BREEDING

Underlying everything in cattle-breeding is the element of temperament. To define temperament, call it an inherited tendency of function. One class of cattle inherit a tendency toward motherhood in an enlarged degree; these we define as belonging to the milk and butter temperament. Another class inherit a tendency toward flesh-making; these we define as belonging to the beef temperament. As you develop the milking temperament, you decrease the flesh-making tendency and heredity and vice versa. It is so in horses as between the speed temperament and the draught temperament. For fifty years the Shorthorn cattle in this country have been bred steadily to establish the beef temperament. In all that time I have never heard of a Shorthorn sire which received a premium at a cattle show because of showing that he had inherited, or possessed the dairy form from which it might be supposed that he would beget cows of a dairy quality. So determined have been the Shorthorn breeders to extinguish all dairy qualities from their cattle, that they universally judge no sire to be of standard breeding that does not show in form and outline that he is of the most decided beef temperament.

Yet with all this strong determination to breed as far away from the dairy temperament as possible, our Shorthorn friends are continually talking of "Shorthorns from a milking strain."

This bold contradiction of all established principles in breeding has caused me to say what I have said for many years on this subject. Is it consistent to steer North and claim we're going South? Is it consistent to breed sires absolutely for the transmission of the beef temperament, rejecting all that show any approach to the dairy form, and then claim that we are producing a "milking strain"?

The result of this inconsistent and illogical juggling with fixed principles of heredity is to the effect that the Shorthorn breeders have deceived themselves and have thus misled a great host of farmers throughout the land into buying beef bred sires with which to produce profitable dairy cows. These farmers wanted the best possible cow machine they could get. Dairy expense is too great to take up with any other with a hope of profit and economical production.

The organization of creameries and cheese factories all over the land makes it possible to look into this question, as well as many others, that effect the well-being of the dairy farmer. This has been done by the aid of the cow census. "Hoard's Dairyman" has been at this work for several years until its files contain a large number of these special investigations into the working of over twelve hundred herds, supplying milk to creameries for twelve months in the States of Vermont, Connecticut, New York, Pennsylvania, Ohio, Indiana, Iowa, Wisconsin and Minnesota.

In the States of New York, Ohio and Wisconsin, several of these census investigations numbering several hundred herds, in each State have been taken. The breeding of every herd, or rather cross-breeding, is given as well as the amount of milk, the butter-fat test, the final earnings per cow at the creamery and the amount of gain, or loss, for every dollar expended in feed. Also an inquiry is made as to the mental status of each farmer, his methods of management, his state of intelligence, what he reads and how he feeds his mind as well as his cattle.

From out this mass of testimony, which as yet has been but very slightly summarized, one would think at least that very valuable data could be obtained on which to build some judgment as to the pro and con of cross-breeding.

Take for instance the last cow census taken in Minnesota which has just been closed in the Dairyman, and see what it tells of this work of breeding and cross-breeding.

## Results from Cross-bred Herds.

The one hundred herds enumerated contained an average of ten cows each, or a total of one thousand; of these, we make the following classification:

One herd pure Shorthorn; 38 herds grade Shorthorn; one herd of Jerseys; 9 herds of Jersey and Shorthorn cross-bred; 9 herds Holstein and Shorthorn cross-bred; 4 herds of Guernsey and Shorthorn cross-bred; 2 herds Brown Swiss and Shorthorn cross-bred; one herd Shorthorn and Rell Poll cross-bred; 2 herds of Shorthorn and Hereford cross-bred, and 20 herds of so-called "natives"; one herd classified as "mixed," which I have placed with the "natives," making 21 in this classification.

The records show in this practical creamery work that of the 38 herds of Shorthorn grades, 14 of them made a loss at the creamery ranging from 32c per cow to $10.51, or an average loss per cow of $3.79.

The remaining 24 herds of grade Shorthorns made a gain at the creamery, ranging from $1.70 to $24.18 per cow. The average profit per cow of the 24 herds was a fraction over $10.26. The pure-bred Shorthorn herd gave a loss of $5.20 per cow.

There was one herd of Jerseys numbering eleven cows which showed a profit of $19.72 per cow; 2 herds of Grade Jersey and Shorthorn cross that gave a loss respectively of $5.18 and $7.68 per cow. The seven remaining herds of this breeding, made a gain respectively of $2.61 to $30.63 per cow.

There were nine herds of the Holstein and Shorthorn cross. Of these, two made a loss, respectively, from 46c to $1.22 per cow. The remaining seven herds of this breeding made a gain, respectively, from $1.21 to $7.44 per cow.

The nicking of Holstein and Shorthorn, by these records, does not appear to be as successful as that of the Jersey and Shorthorn.

The four herds of Guernsey and Shorthorn show a loss in one herd of $6.84 per cow and a gain in the other three from $1.20 to $10.65.

The two herds of the Shorthorn and Brown Swiss cross, show a gain, respectively, of $1.80 and $2.05 per cow. This cross does not indicate a very strong dairy prepotency on the part of the Brown Swiss sire. There was but one herd of the Shorthorn and Red Poll cross. This herd made a gain of $19.41 which was very creditable indeed, but there were not enough herds of this breeding to give a comparison of tendencies or direction of temperament. The breeding on both sides of these families is strongly toward the beef temperament.

The two herds of Shorthorn and Hereford cross both gave a loss, one of 49c and the other of $2.16 per cow.

We come now to an interesting study of the universal cow of this country, so called the "native."

The twenty-one herds classed as "natives" gave results as follows: Ten herds showed a loss ranging from 83c to $6.61 per cow, or an average loss for the ten herds of $3 per cow.

The remaining 11 herds showed a gain ranging from $3.46 with the highest score in the one hundred herds, that of $37.85 per cow.

So far as we can learn this herd was constructed and brought to its present state of good profit by the owner being a good judge of cows in purchasing, and following that up by a most excellent understanding of how to care for and feed a cow after he got her. Of course added to this was the process of elimination, or weeding out of poor cows, which is one of the most important of all processes connected with the management of a dairy herd.

There does not appear to be any demonstration of breeding skill on the part of this owner, nor could there well be considering that he was dealing with a herd of native cattle, which derived their heredity from the hit-or-miss practice of the average farmer.

We can see, however, that this man would make a successful breeder should he attempt it, for he evidently has a large amount of what we might call "cow-sense" or understanding.

## Temperament.

At the outset, I spoke of temperament in cattle. A number of years ago in reasoning on certain things that I found in my studies in cattle-breeding, I was obliged to give a name to this element of inherited tendency, which I called "temperament."

The breeder, if he thoroughly comprehends the scope of his purpose and work, is all the time striving to enlarge by skillful mating this element of temperament in every succeeding generation. If a dairy animal is bred, he wants it more and more developed in this direction through every successive mating. If a trotting horse or a draught horse is bred, the same principle will apply. Without this definite purpose of constant enlargement of the basic temperament, there can be no definite progress made in breeding.

Therefore, we are wise if we study the power and limitations of temperament. From it we will learn never to unite or mate two animals of opposing temperament or tendency. We must study as much as possible to enlarge the stream of temperament, not divide or dissipate it.

We must breed dairy temperament of an agreeing prepotency together as much as possible. For instance, the Holstein has a powerful prepotency towards a large quantity of milk with a small fat globule and a comparative low proportion of butter-fat. Those traits are as strongly inherited as are its color.

The Jersey and Guernsey families have just as strong an inherited tendency or prepotency towards a smaller quantity of milk flow with a much large fat globule and a larger per cent of butter-fat.

Is it a good exercise of breeding skill to attempt to unite in one animal such strong Ayrshire grade, the female comes so far this and widely dissimilar tendencies? Do they usually nick well, and to the purpose of making a better cow therefore? I think not.

With the Ayrshire cow and particulary the way from the rigid prepotent line as above indicated, as to very successfully nick with the Jersey or Guernsey. At least such has been the verdict of actual facts and experience in such breeding. If I were to arrange these forces that we are dealing with so constantly, and I may say many times so blindly, I would state them as follows: (1) Temperament, (2) Function, (3) Form.

We should breed primarily for temperament. Keep it as clear, unclouded and strong as possible. To that end, we must have a strong judgment of the prepotent power of the sire when we select him; on our wisdom in this particular depends almost everything that follows.

Temperament when acting free and unhampered by other opposing tendencies establishes function. Then function establishes form.

So in seeking to know temperament, whether it is of the kind we want, we reason back from form to function and finally to the bed-rock cause of all, which is temperament.

## Constitution.

Now, I want to say a word or two on the question of constitution. That is one of the most important things for you to think about. The most reasonable theory for determining constitution I have ever seen is the structure of the abdomen. Men will tell you that wide between the legs, between the fore legs, deep belly, great lung capacity and heart capacity. There is good sound reasoning. A draft horse is a third wider between the fore legs than a race horse, and yet the draft horse would die if he were put to the same heart action that the race horse is, for in running a mile a race horse uses both lungs and heart to an extent that the draft horse would not do in six months. So I found in my study that the determination of constitution is the structure of the abdomen, the abdominal walls. The mother establishes in the foetus the fact of whether it is thoroughly and strongly nurtured or not. And it is through the umbilicus. It has been noted when a baby was born that when the umbilicus was thin and weak it was hard to raise that baby, but if short and thick and strong the channel of communication and nourishment between the mother and the child was full, that the child came into the world endowed with strong vigor, and that is the basis of constitution. Constitution in the dairy cow is not exposure to the cold, it is the ability to endure the exhaustive work of large milk production, to hold up under it. What is the meaning of constitution? The meaning of constitution in the race horse is ability to endure to the end of the race. The meaning in the draft horse is the ability to endure the heavy pulling. So that as in the old law of logic, in life never compare things that differ. Define constitution in every instance by the character of the function, and if it does not sustain itself within the function, then it is lacking in constitutional vigor. Breed for it. Always breed for it, but do not breed for one kind of constitution when you are needing another in the animal by a different function.

(In concluding Gov. Hoard gave on request of some veterans in the audience his famous description of Sheridan's ride.)

# Profitable Cattle

—BY—

## HON. B. O. COWAN

—OF—

## American Shorthorn Breeders' Association

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Vegetarianism has its earnest advocates who can adduce strong arguments to prove that mankind would live longer and be better if they were less carnivorous, yet despite these arguments the world will move on in the even tenor of its way and the great mass of mankind will continue to eat meat to the extent of their ability to procure it. I have no disposition to carry the discussion of this question farther than to say that the meat consuming nations of the earth have done most for the civilization and development of the world. Hence it may not have been altogether race and national pride which prompted William M. Thackeray to say, "This is the meat that I would eat were I to do battle with any mortal foe. Fancy a hundred thousand Englishmen after a meal of stalwart beef ribs, encountering a hundred thousand Frenchmen who had partaken of a trifling collation of soup, carrots, onions and Gruyere cheese." While mutton, pork and poultry will continue to be an important part of the meat supply of the world, beef is and ever will be the great staple. In relation to other edible meats, beef occupies much the same ratio as corn to other cereals. Hence, to a convention of earnest, investigating live stock breeders the question of the enlargement and improvement of the meat supply and an adequate and remunerative market for it, is of more vital interest than to speculate on the probable result of a contest between an army fed on prime beef and one filled with roots and cereals.

When one reads of the enormous receipts of live stock at our market centers, the impression is likely to result that the supply is out-stripping the demand. During 1905 nearly 17,000,000 cattle, sheep and hogs were received at the Union Stock Yards at Chicago, being an increase over the receipts of 1904 of more than 1,000,000 head. But while the increase in belief is held by many well-informed stock- the meat supply has been very large the men that the population of the world is increasing at a more rapid rate than its meat supply. It would be difficult to prove this theory by statistics in our own country alone, owing to the uncertainty and apparent inaccuracy of estimates of cattle prior to 1901, at which time a different and, we hope, more accurate system of taking the enumeration of cattle was inaugurated. In 1878 when our population was about 48,00,000, we had 30,500,000 cattle, or about 630 cattle to each 1,000 of population. This number increased annually by one to three million head until 1892 when 54,067,590 were reported. From that time our stock of cattle decreased until 1900 when but 43,900,000 were enumerated. The estimate of 1901, under the new system of taking cattle census, shows an enormous increase, raising the number from 43,900,000 to 67,000,000. The increase of over 23,000,000 in one year gives ground for doubting the accuracy of former estimates. From 1902 the enumeration has shown no great change in the number of cattle, and in 1905 61,240,000 were reported. But whether this increased ratio of population over that of cattle can be proven in our own country, it can be easily established in the more densely populated countries of Europe, and while the meat supply is capable of immense expansion, the hungry mouths of the world's teeming millions are also rapidly increasing and are demanding food. But with any country that produces more than its own people can consume, the question of supreme importance is a foreign market, and the prices at which the surplus can be sold in a foreign market fixes, in a large measure, the value of the product put on the domestic market, and when the export demand is restricted or destroyed, loss and disaster are sure to result. This axiom of trade cannot be too strongly emphasized. During past years the foreign demand has taken a considerable portion of our surplus products of grain and meats, but the certainty of having German and other European markets closed against us presents a crisis that should arouse the entire agricultural class of America. It is a condition, and a profoundly serious one, that confronts us. The German government has officially informed the United States that the agreement whereby we can export our products at the minimum tariff rate will cease March 1st unless a reduction be made in our tariff rates. In other words, Germany believes in reciprocity that reciprocates. While our trade with Germany has not been so large as with Great Britain, yet it has been considerable, and has absorbed a large portion of our surplus. We have been selling Germany, annually, about $200,000,000 of products, and have bought from her only $100,000,000. With a reasonable and just modification of our tariff rates, which can be made without detriment or loss to our own people, our trade with Germany and other Continentaal nations could be very largely increased. Because of decreased supply, beef and pork in Germany are selling at fabulous prices, while in the United States there is a surplus seeking market at very low prices. Speaking of this situation Hon. W. A. Harris, former Senator from Kansas, said, "Never was the time so opportune for effecting a commercial treaty with our German friends as the present. The situation in the empire is most critical, the country being involved in a meat famine, the proportions of which have astounded the whole world. Records show that in one year 12,000 horses were slaughtered in Berlin alone for food, and 79,000 were consumed in Prussia for the same year. These horses were not young animals, but old harness ridden beasts, in practically all cases discarded tramway horses." With trade restrictions, it seems the acme of folly to refuse to make a reasonable concession and so lose what trade we have. Senator Cullom, chairman of the Committee on Foreign Relations, in the House of Representatives, has publicly advocated the modification of our tariff rates so as to provide for a maximum and minimum tariff. He gives counsel which should be heeded by our Congress in considering this grave crisis. He says, "We must not go about this matter in the spirit of retaliation. Germany and other countries have the right to adjust their tariff systems to suit their own individual interests. We never have hesitated to exercise that right for ourselves. The tariff is necessarially a selfish affair. We should fix our duties in such a way as to further our own interests both at home and abroad. We want to build up American industries in America, but we cannot do that successfully unless we also build up American trade abroad. There is not the slightest prospect of the adoption of any arbitrary system of reciprocity or the successful negotiation and ratification of any general reciprocity treaties at the present time. If we are not in a position to give Germany or other countries some concessions in return for concessions we demand from them, we shall get the worst of the bargain. Germany can force us to pay maximum rates on goods we send into that country, but Germany will continue to pay our regular rates all the time. We have no weapon to compel her to give us the minimum rate."

### The Pioneer Breed.

The topic, "Profitable Cattle," assigned me by your program gives field for wide discussion. The necessity of crop rotation to conserve the fertility of the soil was learned long ago by those who were wise enough to learn from experience, and that necessity has been strongly emphasized by our agricultural colleges. Coupled with crop rotation, is an agricultural axiom that has not been sufficiently understood by some grain growing sections of our country, viz., no system of agriculture can be permanently successful unless it is founded on the production of live stock. And while there are several breeds of both dairy and beef cattle that can justly lay claim to being profitable cattle, I shall, in this discussion, consider only the beef cattle.

The pioneer breed of beef cattle, and the one most widely distributed, is the Shorthorn. The breed had its origin during the 18th century, in the North of England, in the Counties of Durham, York, Lincoln and Northumberland—early known as North Umbria. They were known as Durhams, Teeswater cattle, from the river Tees, and Shorthorn as distinguished from the Longhorn cattle to which they were the more worthy successors. As the Anglo Saxon race is the blending of the best elements of several nationalities that successively ruled and plundered England for centuries, so the Shorthorn breed of cattle represents the commingling of the best bovine blood of the kingdom, which was intensified and improved by intelligent husbandmen, and soon became, and has continued to be the leading breed of the world. Some importations of these cattle were made to the American colonies during the latter part of the 18th century, but during the first half of the 19th century these importations became numerous, and many of these improved cattle found their way into New York, Pennsylvania, Virginia, and then to Kentucky, Ohio and on to the Mississippi Valley. As the fame of these excellent cattle spread ,the demand for them increased rapidly and consequently their value rose. As early as 1810 Chas. Colling sold 47 head at public sale for an average of $735 ,one bull selling for $5,000, and two cows at $2,000 each. Sales, both public and private, continued with varied success until they reached a climax during the decade from 1865 to 1875. In 1857 an importation was made into Illinois and sold at Springfield at an average of $1,165, and in 1875 J. H. Pickrell, former Secretary of the American Shorthorn Breeders' Association, sold 23 head at Decatur, Illinois, for an average of $1,265, and at this price Mr. Pickrell felt the bidders had robbed him. September 2nd, 1875, Mr. Torr sold 85 head in England at the remarkable average of $2,869, and four days later Lord Dunmore sold 39 head for an average of $3,829, and sold the bull, Duke of Connaught for 4,500 guineas, equal, at that time, to $26,900 American money. But the sensational sale of all bovine history was made at New York Mills, September 10, 1873, where the bidders lost their heads and afterward their money. At this sale 109 head sold for an average of $3,504, and one cow brought $40,600.

As the Shorthorns became scattered through the country they soon made a wonderful improvement on the native cattle. This improvement was greatest in Kentucky and Ohio, into both of which states several importations had been made from England. The farmers of these states soon produced large number of excellent steers, that being matured and fattened then found a market in Baltimore, Philadelphia and New York, after an overland journey of 500 to 800 miles. The pioneers in this overland traffic were George and Felix Renick, of Ohio, the former taking 68 steers across in 1805, and the latter 100 head in 1817, which he sold in Philadelphia for $134 per head. In 1841 R. R. Seymour drove 840 fat steers to Philadelphia, and between these dates mentioned many droves were taken to seaboard markets. Owing to the condition of the country and the profusion of wild grasses it was possible for cattle to make this long journey and arrive in condition of prime beef, at least for that time. The long journey was made by big well-formed steers from 4 to 6 years old, lazily cropping the succulent grasses which grew in rich profusion everywhere, and slaking their thirst in the bubbling springs and clear fresh rivulets with which the country was abundantly supplied. The custom of the feeders and the condition of the markets of that day called for a far different class of beeves from what is required now. In 1855 Mr. B. F. Harris of Champaign, Illinois, sold on the Chicago market 100 grade Shorthorn steers that averaged 2,377 pounds and brought $7 per cwt.

### Injury by Crazes.

During more than 60 years Shorthorn breeders had the American continent as a field of operation, untrammeled by fear of successful rivalry. And had they only pursued the conservative, helpful policy toward each other that has been observed in recent years, Shorthorns would to-day have fewer and less successful rivals. At the time when the importation of rival breeds was being started, many Shorthorn breeders were intensifying the blood of their herds to a dangerous degree by in-breeding and too close line breeding, and were depreciating many valuable herds by the creation and circulation of reports about objectionable and unfashionable crosses, and in some instances manifested more zeal in tearing down the herds of fellow breeders than in building up their own. During this period much bitterness between breeders was engendered and prejudices against several families of Shorthorns were started that have done incalculable harm to the breed. Tribes that had produced noted prize winners and most excellent sires were driven from positions of great popularity by objections which, in many cases, had no real foundation. The effect of this senseless crusade against so-called "unfashionable crosses" was to greatly restrict breeders in the selection of herd bulls, and some of the very best bulls of the breed were not used because of this prejudice. This was followed by a "color craze" during which no breeder dared to use a white bull in his herd, and very few had the courage to use roans. The prejudice sent many white and roan bulls of outstanding merit to the feed lots, and so restricted breeders in the choice of herd bulls. It was during this period when the Shorthorn breed was assailed from within by jealousies of its advocates, the color craze and unfashionable crosses, that it met the first organized opposition from without by the importation of rival breeds.

Owing to their early importation to this country, their wide distribution and great popularity, Shorthorns have moulded the character of the cattle of our country as no other breed has been able to do. And this splendid foundation, laid in thousands of graded herds, was built upon by the Herefords or Angus, and some of the cross-bred champions that have brought renown to rival breeds, would in an ultimate analysis, show considerable Shorthorn blood.

During the fat stock shows held some years ago, Shorthorn steers were champions in nearly all contests. During the International Shows for five years the champion steers have been from other breeds. This, however, must not be taken to indicate a retrograde in Shorthorns. At the shows of breeding stock, Shorthorns have grown stronger year by year, but very few breeders have given attention to the preparation and exhibition of steers, and particularly of the better class of steers. This work has been undertaken with judgment and great zeal by the other breeds, and success has crowned their efforts.

### The Shorthorn's Claims.

The specific claim of superiority made for Shorthorns is that they come nearer answering every purpose of the farmer and stock grower than any other breed. They are surpassed by none in the produce of edible beef, while in the production of milk Shorthorn cows surpass all beef breeds. In scale they are generally conceded to lead their rivals, and in the Xmas issue of the Breeders' Gazette, Mr. John Clay stated that ranchmen who had been using Hereford bulls would be compelled to return to the use of Shorthorns to increase the size of their cattle.

Gentlemen, you have been entertained and entertained admirably by the speaker who preceded me, and who, according to his standard has forever put to sleep any claim that the Shorthorn breeder might make for her as a dual purpose animal. Now, I recognize this fact: that the specialist will succeed in his line. The physician who, after laying a broad foundation as a means of education takes a special course, specializes and prepares himself in some particular line of work will, of course, outstrip in that particular work men who are not specialists. We recognize the fact that the man who attempts to produce the highest type of beef animal, the highest type of dairy animal in the same animal will inevitably fail. That far I endorse what has been said, and endorse it most heartily. We accord to the dairy breed supremacy as dairy cattle, but we do not accord to the beef breeds supremacy in the ultimate test for the beef cattle; but while we accord to the dairy production of butter fat, I cannot and will not admit that it is absolutely impossible to have a dual purpose animal and to have a successful dual purpose animal. I want to say that a man cannot produce a beef animal that will go to our great contests and there meet the test of the opposing breed and win the prize if he attempts to have that cow give milk. It would be folly, and yet, as a matter of experience as a Shorthorn breeder and as a man who has produced winners in Shorthorn contests, I say it is possible to take an animal, the beef animal that is a remarkable milk producer, and take that animal and make it a winner in a beef contest. I have in my mind now a pair of Shorthorn heifers which I exhibited as calves and as yearlings all over the shows of the West and those

two heifers took first and second in every contest in which they entered. They were relegated to the breeding herd at two years of age, and were not shown. One of those was one of the finest milk producers ever in my herd, and while I patronize the creameries I say to the producers, and I say here, that Shorthorn cow when her calf was three weeks old produced from four to five gallons of milk per day more than that calf took. Is that not a dual purpose cow? Can you point to very many of your own dairy cows that send their butter-fat to the creamery who will equal the record of that cow?

Mr. Lantz: Did she keep it up after her calf was six months old?

Mr. Cowan: I took her to the state fairs and in contest with other cows won $370 for her milk production when her calf was six months old. That is milking at least successfully a good length of time. Now, don't understand me to claim the Shorthorn as a dairy cow any supremacy to the dairy breeds. I make no such claim, and the breeders make no such claim. But the Shorthorn breeders of this country do make the claim that they have a dual purpose animal and a successful dual purpose animal, one that in point of beef production is surpassed by none, and in the production of milk is a very creditable animal. I give due credit to all that has been said, but I protest, and I desire to protest with all the emphasis that is possible for me to put into words, to the statement that it was absolutely impossible and silly and fallacious to talk about an animal that is a successful dual purpose animal. Let me point you to-day to the dairy cattle of England, and from what breeds do they come? The dairy cattle of Great Britain to-day are taken largely from the Shorthorn breed, and you can go to the dairies of that country and successfully establish the fact that what I am claiming here is correct. I will admit what Gov. Hoard has said, that many Shorthorn breeders have bred out of their cattle the ability to make successful cows. In other words they have intensified the beef producing qualities of their cattle and at the expense of the dairy qualities. But in spite of all that, in spite of the fact that they have overbred as beef cattle, we have to-day numerous instances where we can point them out herds in this state and in New York that are making a very creditable exhibit as milk producing cows. Now, then, we want to be charitable. I give to other breeds every just claim that they can present in favor of their cattle. I want to say here, that the man who attempts to succeed by misrepresentation of his fellows in the race for life is not doing them justice. I do not, of course, refer to anything that has been said here to-day. I make that as a general statement: that we want to be generous to our rivals, we want to accord them just merit of the cattle they are defending.

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# THE MARKET HORSE

### By Prof. Carl W. Gay, College of Agriculture, Ohio State University.

The first thing that presents itself to you, undoubtedly, is: Why a market horse? What is the difference between a market horse and a horse? Just that is the real keynote of what I have in mind. The difference between a market horse and a horse may be the difference between success and failure. That is the point I want to emphasize.

Now, what is a market horse? In the first place, commerce is an exchange of commodities. The market is the medium for the exchange of these commodities. In other words, the horse market is the medium of the exchange of horses. What determines this market? You say the producer on the one hand and the consumer on the other. It is the medium between the producer and the consumer. Which is the more important? The producer, of course, is concerned with the market, but the consumer is concerned to a greater extent. The market fluctuates with every wave of over-production and under-production. Over-production is usually associated with a falling off in consumption. Under-production with an excessive consumption. Isn't it the consumer that is the determining factor to a greater degree than the producer? In other words, you take a horse to a man and say, "I will sell you this horse for $200." That horse is not sold, however, until the consumer—the other man—says: "I will give you $200 for your horse." He is the man who determines the market.

Now then, what is our market horse? It is the type determined by the consumer; the type for which there is a market demand. We have heard from the different speakers today, something about ideals. The market type will be our ideal. It is not sufficient, simply to possess an ideal; that ideal must be a correct one. If a man is breeding for fun he can follow his own ideals and notions and it is nobody's business but his own. However, that man cannot complain of the condition of the market. When a man is breeding for business he must conform his ideal to that of the people who are to take his product. He must study his market. So, the correct ideal for the horse producer is, the market type—that type determined by the demand. Perhaps a little discussion of this type will not be out of order. Take for instance ,the draft horse—usually considered the "farmer's horse." What is the market type demanded in the case of a draft horse of today? We do not need to go into details. There are certain things that are common to all draft horses; there are certain things common to all coach horses and, in fact, certain things common to all horses. Every horse must have sloping pasterns and a good foot, a good eye and a good head; but there are certain things which determine the type—things by which you can discriminate between a coach horse and a draft horse; between a speed horse and a coach horse. The first thing to consider in the discussion of the draft type, the first thing your draft horse buyer will consider, is, weight. You ask the reason; what is the importance of weight? It has been figured out that a horse's value increases at the rate of 25 cents per pound for every pound that he weighs over 1,400. In other words, the difference between a 1,400 and an 1,800 pound horse, roughly, is $100. There is a good reason for this premium placed on weight. It is based on mechanical principles. Perhaps you do not know, but it is a fact, that when the locomotive first came into use there was a great deal of trouble in getting the wheels to advance the engine and not to slip. The idea of cogs and all such devices presented themselves as a solution to this problem. By accident one day, the load that was to be hauled in the cars was placed on the engine and it was found that where, heretofore, that engine had slipped the wheels and failed to advance with a load, when that load was placed on the engine there was no further trouble. So today our freight engines usually are heavier; not altogether because it takes more mechanism to furnish more power, but that their greater weight increases their efficiency. You take a draft horse on our city pavements and work him along side of a lighter horse—they may both take the same load ,but how do they accomplish the same end? The draft horse throws his weight into the collar; applies his power and walks away with the load. The light horse, with his courage, ambition and perhaps muscular power could start the load but for one thing; when he puts his weight into the collar and applies the power he does not move away with the load but is pulled to his knees; he has the strength but he cannot utilize it. You know of the old custom among stage-coach drivers in the East, where hills are so common—when heavily loaded and stuck on a hill the custom was for the driver to get out and ride the near horse or, if hauling mill stuff or the like, to put a few sacks on the horse's back; the weight thus taken from behind the horses and placed on their backs furnished them the necessary weight to hold them to their work, thereby accomplishing that which had been impossible before.

I had a little time with a buyer, yesterday, a representative of a large New York firm, and he would not look at a horse that weighed less than 1,600 pounds. His standard was a ton.

### Horse Mechanism.

We cannot overlook this matter of weight. Before we go any farther let me emphasize the importance of regarding the horse as an animal mechanism. We do not mean by this to think of him simply as a machine, and abuse him as such, but to consider something of the mechanism involved. Take the electric car, by way of comparison; you have the wheels by which the car moves, the motor under the car which furnishes the power to move these wheels, and the controller on the head end of the car, in the hands of the motorman, by which the power to move the wheels is controlled and directed. In the case of the horse, we have a set of bony levers, represented by the limbs ,by which the horse moves; attached to these bones are a series of muscles constituting the power system by which these levers are operated. This muscular system, in turn, is under the control and direction of a nervous system; the nervous system ,if you choose, directed by the driver, and, the whole combination resulting in coordinate movement.

The second consideration in draft type, is, low setness. Buyers, as a rule, do not want a horse leggy, or, up in the air. It is true that an up-standing horse looks better before some of the big city vans and a buyer for that particular purpose will not emphasize the low setness; but, in a general way, a horse's weight and power are more effective as they are nearer the ground. We have ample demonstration of this fact on the gridiron; the men are continually coached to "play low," where their efforts are most efficient. In addition to this, by the law of correlation of parts, the horse which stands close to the ground is also broad, deep and compactly made; while the horse which is long on his legs is very apt to be narrow, shallow bodied, flat-ribbed, long and loose coupled. It is desirable to have him broad, deep and compact, for the reason that he derives his power from his muscular system, he must have a foundation—a bony skeleton—and the more breadth and depth there is to his skeleton, the greater the basis for muscular development. Compactness is an advantage in that it admits of the application of power to the best advantage. Power in the horse is resident in the hind quarters, but it is exerted against the collar; the more direct the application of this power—in other words the less distance between the hind quarter and the collar—the less is the loss of power. Then too, a short stick is more rigid than a long one. The compact horse will have a stronger back line through which to transmit this power than the horse that is more loosely made.

The one thing which means most in the description of a draft horse is, massive. If he is not massive he is not a draft horse. To what does this massiveness refer? Muscular development. If the horse is low set, broad and deep, he will have the muscular development which gives him massiveness.

This, in brief, then, is the draft horse type.

All structures, however, have a function, and we cannot leave a consideration of this draft horse structure without some reference to its function. The draft gait is a walk, and no one who knows his business will permit a draft horse to do anything else but walk at his work. In order that he may cover the most ground with the least effort to himself and in the shortest time, his stride must be long, straight, snappy and free.

To recapitulate, our ideal, which is the market type of draft horse, must first of all possess weight, then he must be low-set, broad, deep, compact and massive, and have a way of going that is especially serviceable for draft purposes.

## A GREAT JOINT MEETING.

Beginning on Tuesday, January 22, 1907, Pennsylvania Farmers, Breeders and Dairymen will hold a great joint meeting at Harrisburg. The State Board of Agriculture will begin its regular session on Tuesday, the Live Stock Breeders' Association will begin its meeting on Wednesday and the Dairy Union will run its exhibit throughout the week, beginning its literary session on Thursday. The following special features will add interest to the occasion.

### SHOW OF FRUITS AND VEGETABLES.

This will be held by the State Board of Agriculture. For particulars address Sec'y N. B. Critchfield, Harrisburg, Pa.

### CORN AND ALFALFA.

The Pennsylvania Live Stock Breeders' Association will inaugurate a Corn and Alfalfa exhibition. Liberal prizes will be offered, and all are invited to compete for them, members or non-members. We especially urge members of the Associations here represented to compete. Particulars will be furnished later on application to Secretary E. S. Bayard, East End, Pittsburg.

### DAIRY PRODUCTS AND MACHINERY.

The Pennsylvania Dairy Union will have a great exhibition of Dairy Products, Machinery, Appliances, etc. including a show of milking machines. Prizes will be offered for butter, cheese and milk. Apply to Secretary W. E. Perham, Niagara, for particulars.

Come out and help, everybody!

# WHAT WE BREED

Pure Bred Stock Bred by Members of the Pennsylvania
Live Stock Breeders' Association

## HORSES.

### ARABS.

Name. Postoffice. County.
Herman Hoopes..........Westchester, Chester

### MORGANS.

A. R. Van Tassel............DuBois, Clearfield
Geo. A. Hogg.....24th & R. R. Sts., Pittsburg
M. B. Stephens.............Dilltown, Indiana

### CLEVELAND BAY.

Powell Bros..............Shadeland, Crawford

### FRENCH COACH.

Powell Bros...............Shadeland, Crawford

### CLYDESDALE.

Powell Bros...............Shadeland, Crawford

### FRENCH DRAFT.

Powell Bros...............Shadeland, Crawford

### SUFFOLK PUNCH.

Powell Bros...............Shadeland, Crawford

### BELGIN DRAFT.

Powell Bros...............Shadeland, Crawford

### STANDARD-BRED.

Benj. McKeehan........Mt. Rock, Cumberland
W. C. Norton..................Waymart,Wayne
Homer Bros.................Greenville, Mercer
J. Blair (Carriage type).Hartstown, Crawford
Henry Palmer................Avondale, Chester
W. A. McCoy & Sons..........Mercer, Mercer
Ezra Michener.................Michener, Bucks
Powell Bros..............Shadeland, Crawford
W. E. Stevenson..Burgettstown, Washington
J.M.Main & Sons.....Shippensburg, Cumberl'd

### SHIRE.

Sam'l McCreary..............Volant, Lawrence
Wm. L. Christley........Slippery Rock, Butler
Geo. A. Hogg....24th & R. R. Sts., Pittsburg
Powell Bros..............Shadeland, Crawford

### PERCHERONS.

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D. S. Kloss.........................Tyrone, Blair
A. M. Dickson & Son...Cochranton, Crawford
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J. M. Main & Sons..Shippensburg, Cumberl'd
Geo. A. Hogg....24th & R. R. sts., Pittsburg
W. A. McCoy & Sons.........Mercer, Mercer
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### THOROUGHBREDS.

R. S. Hartley.............Youngsville, Warren

### HACKNEYS.

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### SHETLAND PONIES.

Wm. F. Gable............Wyebrooke, Chester
W. M. Thompson..........Uniontown, Fayette
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Powell Bros..............Shadeland, Crawford

## CATTLE.

### ABERDEEN-ANGUS.

W. H. Rink................Johnstown, Cambria
W. L. Christley........Slippery Rock, Butler
Jas. Blair..................Hartstown, Crawford
Bayard Bros..............Waynesburg, Greene
Penn'a State College.....State College, Center
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### AYRSHIRES.

Willis W. Hopkins.........Aldenville, Wayne
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### BROWN SWISS.

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J. Cheston Morris........Westchester, Chester
Powell Bros..............Shadeland, Crawford

### POLLED ALBIONS.

B. E. Ferris........................Hector, Potter

### HEREFORDS.

J. I. Barley..........Baker's Summit, Bedford

### HOLSTEINS.

W. T. Suter........Riverside, Northumberland
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H. M. Lyon & Sons......Wyalusing, Bradford
J. B. Henderson...Burgettstown, Washington
B. F. Jones............South Montrose, Susq.
A. S. Worden....................Frederick, Md.
Geo. G. Paxton.........Houston, Washington
W. E. Stevenson..Burgettstown, Washington
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J. M. Quivey & Sons...Houston, Washington
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Penn'a State College.....State College, Center
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Nelson Poorbaugh......Mt. Pleasant, Westm.
Wm. F. Gable............Wyebrooke, Chester
R. S. Hartley.............Youngsville, Warren
Irwin F. McKee....Washington ,Washington
H. H. Snavely.......Willow Street, Lancaster
Wm. Thompson, Jr............Lemont, Center
Geo. G. Paxton..........Houston, Washington
J. H. Peachy.................Belleville, Mifflin
W. H. Ridge.......................Trevose, Bucks
H. C. Bughman...Greensburg, Westmoreland
R. F. Shannon........907 Liberty st., Pittsburg
Henry Palmer................Avondale, Chester
Ezra Michener.................Michener, Bucks
H. W. Comfort.............Fallsington, Bucks
R. S. Love.....Mt. Pleasant, Westmoreland

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R. I. Young..............Middletown, Dauphin
Geo. Erk........................Seelyville, Wayne
J. F. Lantz & Co..........Glenmoore, Chester
B. W. McKeehan.......Mt. Rock, Cumberland
A. L. Martin..............Harrisburg, Dauphin
Edward Walter.........West Chester, Chester
A. P. Warren.............Elizabeth, Allegheny
Jas. H. Cowan............Duquesne, Allegheny
J. M. Main & Sons...Shippensburg, Cumberl'd
John B. Kepple....Greensburg, Westmorel'd
W. F. Shrum......Adamsburg, Westmoreland
M. P. Shoemaker & Bro...Greensburg, West.
G. H. Knapp.................Aldenville, Wayne
L. W. Lighty...............East Berlin, Adams
R. S. Hartley...........Youngsville. Warren
J. I. Barley.........Baker's Summit, Bedford
W. E. & J. J. Perham.......Niagara, Wayne
W. C. Norton..................Waymart, Wayne
S. E. Nivin................Landenburg, Chester
A. T. Replogle.............Waterside, Bedford
Austin Leonard & Son..........Troy, Bradford
W. F. Wagner....Harrison City, Westmorel'd
Clarence M. Glasgow.....Calvin, Huntingdon
Herman Hoopes..........Westchester, Chester
W. W. Harrison...119 N 11th st., Philadelphia
R. F. Shannon.......907 Liberty st., Pittsburg
Henry H. Randt............Pipersville, Bucks
J. B. Wylie..........Washington, Washington
W. F. McSparran..........Furniss, Lancaster
E. B. Boyle.........Canonsburg, Washington

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D. C. Andrews.......West Newton, Westm'd
Lee R. Scott......Burgettstown, Washington
Chas. Buchanan.................Utica, Venango
J. C. Mattern & Sons....Hollidaysburg, Blair

### RED POLLS.

B. E. Ferris.......................Hector, Potter
N. O. Brownlee..........Crothers, Washington
A. M. Dickson & Son...Cochranton, Crawford
D. Norman App...........Selinsgrove, Snyder

### SHORTHORNS.

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W. M. Thompson..........Uniontown, Fayette
F. N. Hubbard...................Troy, Bradford
J. R. Truxal......Greensburg, Westmoreland
John A. Cummins........Waynesburg, Greene
Geo. G. Strosnider.......Waynesburg, Greene
G. D. Walker.....................Salona, Clinton
J. L. Stouffer.......Southwest, Westmoreland
Jos. T. Fleming..............Belleville, Mifflin
W. J. Monroe.....Greensburg, Westmoreland
Ralph Minner & Sons..........Mercer, Mercer
W. C. Black.......................Mercer, Mercer
B. L. Post's Sons....West Alexander, Wash.
A. S. Eagleson & Sons....Washington, Wash.
L. Douthett...............Thornhill, Allegheny
W. A. McCoy & Sons...........Mercer, Mercer
Lee R. Scott.......Burgettstown, Washington
Penn'a State College.....State College, Center
A. G. Shaffer.........Rural Valley, Armstrong
L. D. May..........Granville Center, Bradford
R. C. Vance.......Burgettstown, Washington
R. L. Munce.........Canonsburg, Washington

## SWINE.

### BERKSHIRES.

J. N. Glover...................Vicksburg, Union
George Black.................Plumville, Indiana
Penn'a State College.....State College, Center
A. S. Worden....................Ulysses, Potter
R. W. Crothers & Son...Taylorstown, Wash.
Geo. W. Mellotte...................Lisbon, Ohio
Edward Walter...........Westchester, Chester
J. M. Main & Sons..Shippensburg, Cumberl'd
Nelson Poorbaugh...Mt. Pleasant, Westm'd
Sam'l McCreary..............Volant, Lawrence
Jas. L. Henderson...Washington, Washington
L. W. Lighty..............East Berlin, Adams
A. H. Erdman.............Wiconisco, Dauphin
J. B. Henderson...Burgettstown, Washington
John A. Cummins.......Waynesburg, Greene
G. D. Walker.....................Salona, Clinton
Ralph Minner & Sons...........Mercer, Mercer
J. Cheston Morris........Westchester, Chester
T. M. Shively..................Mifflinburg, Union
W. C. Black......................Mercer, Mercer
Homer Bros..................Greenville, Mercer
H. C. Bughman...Greensburg, Westmoreland
R. F. Shannon............Pittsburg, Allegheny
A. S. Eagleson & Sons...Washington, Wash.
N. O. Brownlee.........Crothers, Washington
S. V. McDowell................Fredonia, Mercer
W. F. McSparran............Furniss, Lancaster
R. S. Love.......Mt. Pleasant, Westmoreland
J. M. Paxton............Houston, Washington

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B. L. Post's Sons.....West Alexander, Wash.
George Black.................Plumville, Indiana
S. S. Blyholder................Neale, Armstrong

### ESSEX.

H. C. & M. R. Elder.......Darlington, Beaver

### CHESTER WHITES.

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J. Grier Dain..................Malvern, Chester
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J. C. Mattern & Sons....Hollidaysburg, Blair
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J. E. Woodmansee........Lake Como, Wayne
M. P. Shoemaker & Bro...Greensburg, West.
Benj. McKeehan.......Mt. Rock, Cumberland
W. F. Gable..............Wyebrooke, Chester
H. M. Lyon & Sons......Wyalusing, Bradford
Willis W. Hopkins.........Aldenville, Wayne
J. R. Truxal.....Greensburg, Westmoreland
F. W. Levis............Chadd's Ford, Chester
A. T. Replogle............Waterside, Bedford
Jos. T. Fleming..............Belleville, Mifflin
W. J. Monroe.....Greensburg, Westmoreland
D. S. Kloss........................Tyrone, Blair
Henry H. Randt............Pipersville, Bucks
W. A. McCoy & Sons..........Mercer, Mercer
A. M. Dickson & Son (O I C)
Cochranton, Crawford
J. Grier Dain..................Malvern, Chester

### MULE FOOT HOGS.

A. M. Dickson & Son...Cochranton, Crawford

### POLAND-CHINAS.

J. C. Mattern & Sons.....Hollidaysburg, Blair
D. Norman App...........Selinsgrove, Snyder
A. G. Shaffer.........Rural Valley, Armstrong
A. P. Warren............Elizabeth, Allegheny
Edward Walter...........Westchester, Chester
C. A. Hershey...........Gettysburg, Adams
W. F. Wagner..Harrison City, Westmoreland
J. L. Stouffer......Southwest, Westmoreland
Burns & Adams..........Imperial, Allegheny
J. H. Peachey................Belleville, Mifflin

### TAMWORTHS.

R. S. Hartley............Youngsville, Warren
Henry Palmer................Avondale, Chester
M. P. Shoemaker & Bro., Greensburg, West.

### VICTORIAS.

Jas. Blair................Hartstown, Crawford

### CHESHIRES.

Penn'a State College.....State College, Center

### YORKSHIRES.

R. F. Shannon.....Edgeworth Sta., Allegheny
John B. Kepple...Greensburg, Westmoreland
F. B. Stewart.............Espyville, Crawford
H. C. Bughman...Greensburg, Westmoreland

## SHEEP.

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John M. Berry......Wylandville, Washington
R. P. Berry.........Eighty-four, Washington
Wm. Berry..........Washington, Washington
R. L. Munce.........Canonsburg, Washington

### DELAINE MERINOS.

Geo. G. Paxton.........Houston, Washington
Lee R. Scott.....Burgettstown, Washington
E. B. Boyle.........Canonsburg, Washington

### SOUTHDOWNS.

Ludwig S. Filbert....Fox Chase, Philadelphia
Edward Walter..........Westchester, Chester
W. A. McCoy & Sons.........Mercer, Mercer
J. Grier Dain..................Malvern, Chester

### DORSETS.

T. M. McKee................Lewistown, Mifflin
A. S. Eagleson......Washington, Washington
J. B. Henderson...Burgettstown, Washington
S. Shaffer.................Princeton, Lawrence
J. B. Wylie..........Washington, Washington
Henry Palmer..............Avondale, Chester

### LINCOLNS.

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T. M. Shively................Mifflinburg, Union
W. A. McCoy & Sons..........Mercer, Mercer

### COTSWOLDS.

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Jas. Blair..................Hartstown, Crawford
Edward Walter..........Westchester, Chester

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### OXFORDS.

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A. S. Worden.....................Frederick, Md.

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J. C. Mattern & Sons.....Hollidaysburg, Blair
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Edward Walter...........Westchester, Chester
Wm. F. Gable............Wyebrooke, Chester
C. A. Hershey.............Gettysburg, Adams
S. Shaffer..................Princeton, Lawrence
A. T. Replogle............Waterside, Bedford
Jos. T. Fleming..............Belleville, Mifflin
Wm. Thompson, Jr...........Lemont, Center
Clarence M. Glasgow.....Calvin, Huntingdon
W. C. Black......................Mercer, Mercer
B. L. Post's Sons....West Alexander, Wash.
Herman Hoopes.........Westchester, Chester
D. S. Kloss.........................Tyrone, Blair
J. C. Andrews..................Mattie, Bedford
John W. Burket....................Tyrone, Blair

## POULTRY.

### PLYMOUTH ROCKS.

W. J. Monroe.....Greensburg, Westmoreland
W. T. Suter (W.)..Riverside, Northumberland
J. A. Herr (B)...............Mill Hall, Clinton
M. N. Clark (B).....Claridge, Westmoreland
Edward Walter...........Westchester, Chester
H. C. & M. R. Elder (B)...Darlington, Beaver
J. F. Lantz & Co..........Glenmoore, Chester
Penn'a State College.....State College, Center
A. P. Warren (B&Buff) Elizabeth, Allegheny
T. M. McKee (B)...........Lewistown, Mifflin
D. N. App (B & W)........Selinsgrove, Snyder
Jas. H. Cowan...........Duquesne, Allegheny
Nelson Poorbaugh (Wh) Mt. Pleasant, West.
C. A. Hershey (B).........Gettysburg, Adams
M. P. Shoemaker & Bro. (W) Greensbg, West.
W. H. Gray (B)..........Brookville, Jefferson
H. M. Lyon & Sons (B)..Wyalusing, Bradford

J. I. Barley..........Baker's Summit, Bedford
J. R. Truxal (B)...Greensburg, Westmoreland
John A. Cummins (B)....Waynesburg, Greene
G. D. Walker......................Salona, Clinton
A. T. Replogle.............Waterside, Bedford
Dr. J. Stewart Lacock (Wh)...Pittsburg, Ally.
W. F. Wagner (B)...Harrison City, Westm'd
J. L. Stouffer (B)..Southwest, Westmoreland
Jos. T. Fleming (Wh)......Belleville, Mifflin
Burns & Adams...........Imperial, Allegheny
Wm. Thompson, Jr. (B).......Lemont, Center
J. H. Peachey (B)...........Belleville, Mifflin
J. Wolf Evans (Bf).......Spring Mills, Center
Herman Hoopes (B).....Westchester, Chester
A. S. Eagleson & Sons (B) Washington, Wash.
N. O. Brownlee (B)....Crothers, Washington
S. V. McDowell (B).........Fredonia, Mercer
Henry Palmer (Bf).........Avondale, Chester
J. C. Andrews (B).............Mattie, Bedford
W. A. McCoy & Sons (Wh)...Mercer, Mercer
Nelson Bros. (B)..........Grove City, Mercer
J. Grier Dain (B).............Malvern, Chester
Penn'a State College (B) State College, Center
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J. M. Paxton (Bf)......Houston, Washington

### COCHINS.

J. N. Glover (B).............Vicksburg, Union
Pa. State College (Lt)..State College, Center
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Pa. State College (Bf)..State College, Center

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R. F. Shannon..........Pittsburg, Allegheny
Pa. State College (PC)..State College, Center

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T. E. Orr.........................Beaver, Beaver

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Pa. State College (WC)..State College, Center

### WYANDOTTES.

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Pa. State College....State College, Center
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R. W. Crothers & Son (W) Taylorstown, Wash
A. G. Shaffer (Sil.)..Rural Valley, Armstrong
Wm. F. Gable (Bf)......Wyebrooke, Chester
C. A. Hershey (Wh)......Gettysburg, Adams
L. W. Lighty (Wh).......East Berlin, Adams
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Dr. J. Stewart Lacock (Wh)..Pittsburg, Ally.
W. F. Holtzer (Bf).Greensburg, Westmorel'd
B. L. Post's Sons (Wh) West Alexander, Wash
Homer Bros. (Bf)...........Greenville, Mercer
H. C. Bughman (SL) Greensburg, Westm'd
D. S. Kloss (Wh).................Tyrone, Blair
Ezra Michener................Michener, Bucks
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R. S. Love (W).....Mt. Pleasant, Westm'd

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R. S. Hartley..............Youngsville, Warren
Pa. State College (Blk)..State College, Center

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Pa. State College (Lt)..State College, Center

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A. P. Warren (Bf)......Elizabeth, Allegheny
Nelson Poorbaugh (Wh).Mt. Pleasant, West.
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R. S. Hartley (Bf & Br) Youngsville, Warren
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Nelson Bros (S.C.B)......Grove City, Mercer
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D. N. App (WHol)........Selinsgrove, Snyder
John M. Berry (WH)....Wylandville, Wash.
W. H. Gray (Br)........Brookville, Jefferson
B. F. Jones (Bl).........South Montrose, Susq.
J. R. Truxal (Br)..Greensburg, Westmorel'd
J. L. Stouffer (Br)..Southwest, Westmoreland
Clarence M. Glasgow (Br).Calvin, Huntingdon
T. M. Shively (WH)........Mifflinburg, Union
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| M. P. Shoemaker & Bro. | Greensburg, West. |
| W. H. Gray | Brookville, Jefferson |
| H. M. Lyon & Sons | Wyalusing, Bradford |
| R. S. Hartley | Youngsville, Warren |
| J. I. Barley | Baker's Summit, Bedford |
| J. R. Truxal | Greensburg, Westmoreland |
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### BEAGLES.

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| W. H. Gray | Brookville, Jefferson |

### SHEPHERD.

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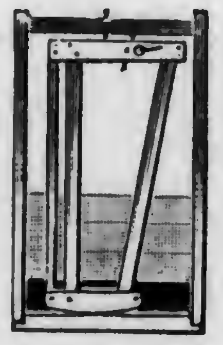

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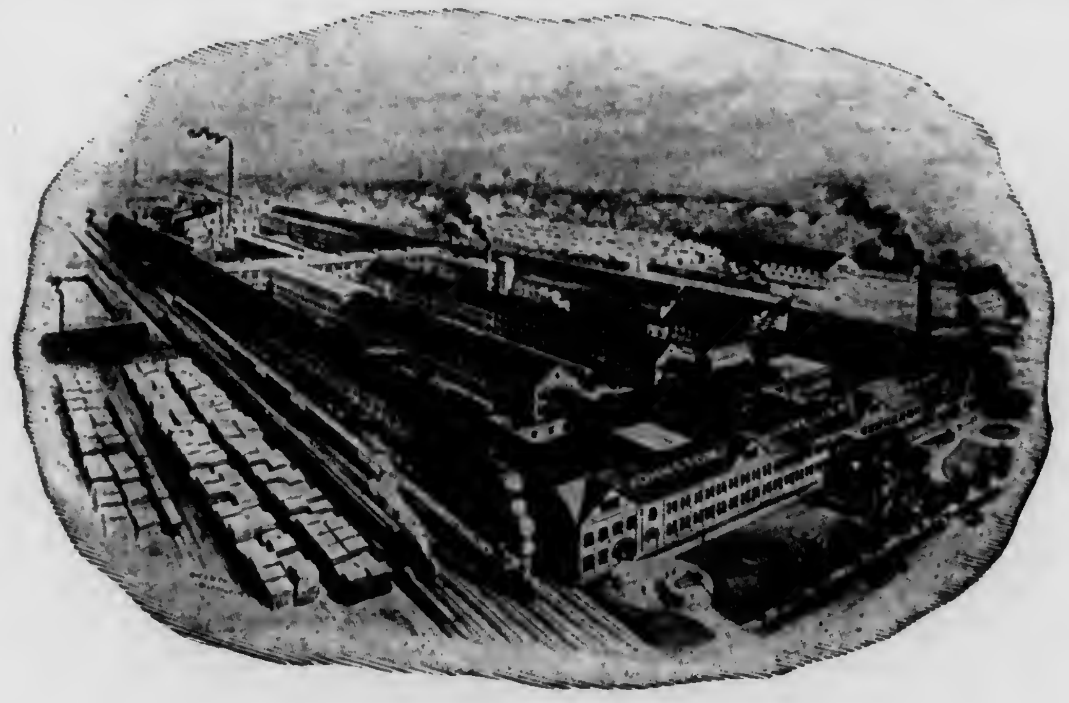

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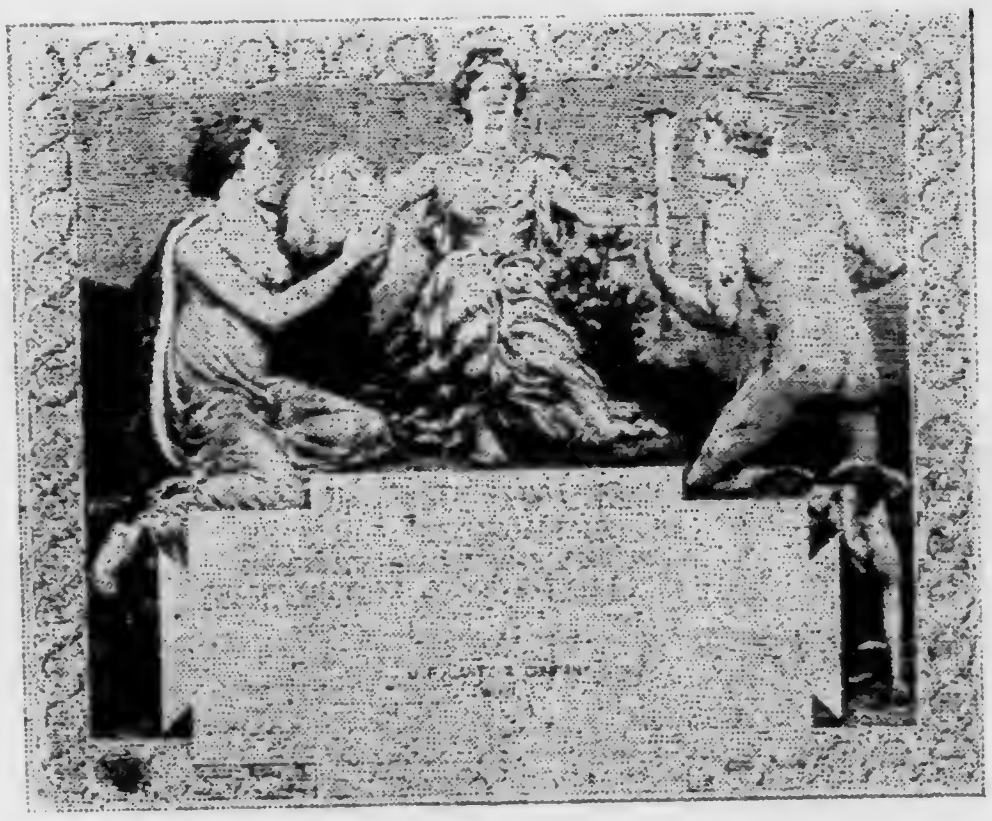

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Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1907

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1907

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BULLETIN No. 13

OF

# THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

PROCEEDINGS AND PAPERS

OF THE

## EIGHTH ANNUAL MEETING

HELD AT

HARRISBURG, JANUARY 23-25, 1907

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### Proceedings and Papers of

# Eighth Annual Meeting

### of the

# Pennsylvania Live Stock Breeders' Association

### and the

# Pennsylvania Dairy Union

### Held at

## Harrisburg, January 23-25, 1907

⁂

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# PENNSYLVANIA
# LIVE STOCK BREEDERS' ASSOCIATION

## PROCEEDINGS OF THE EIGHTH ANNUAL MEETING

HELD AT

HARRISBURG, PA., JANUARY 23-25, 1907

## PREFACE

January 22, 23, 24 and 25 the State Board of Agriculture, the Pennsylvania Live Stock Breeders' Association and the Pennsylvania Dairy Union held their meetings at Harrisburg. No such crowd of farmers and dairymen ever before turned out to Pennsylvania meetings. The hall was filled to its fullest capacity and at some of the sessions standing room was none too plentiful. All three organizations contributed their share to the success of the meetings, and all worked in harmony. Acknowledgements should be made especially to the officers and committees of the different organizations, who worked hard for their success; to the speakers, who were liberal with their time and energy; to Hon. N. B. Critchfield and his staff, who attended to local preparations and did much for us in many ways; to Henry Palmer and Joshua Sharpless for their work in arranging the Corn Show, to the manufacturers and their representatives who made the display of dairy machinery and supplies an interesting feature, and to many others whom we cannot pause to name.

We again apologize for the tardiness of this report. We regret that it is not more promptly issued and more complete in every particular. But our friends will please remember that we are busy men, that our services are given without compensation, and that all work of this kind has to be done at odd moments.

Our thanks are due especially to The National Stockman and Farmer of Pittsburg, for its contribution of $100 to the prizes for the Corn Show, and for its assistance in preparing this report. Also to many journals throughout the state for their courtesy in publishing our announcements.

We feel that the era of real progress in Agriculture, Live Stock Husbandry, Dairying, Horticulture, etc., in Pennsylvania has just opened. With a stronger agricultural college than ever before, with better organizations and more of them, with good markets present and prospective, everybody should feel encouraged and go to work to spread the gospel of progress.

W. E. Perham,
Sec'y Penn'a Dairy Union.
E. S. Bayard,
Sec'y Penn'a Live Stock Beeders' Asso'n.

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At the close of the business of the State Board early Wednesday evening, Hon. W. C. Norton, President of the Pennsylvania Live Stock Breeders' Association takes the Chair, and the remaining part of the session of Wednesday evening, January 23rd, is conducted by the Breeders' Association.

President Norton: Gentlemen: I am glad to see so many faces here tonight. As we have several good speakers to be heard, the President's address will be dispensed with.

The first number on the program is a paper by A. E. Norton. My son is unable to be here at this time, so we will omit that.

Prof. Harry Hayward is here, and as he will have to leave tonight, he has requested that we give him the first place on the program, and as I suppose there will be no objection, I will call on Prof. Hayward.

Prof. Hayward: I want to express my pleasure in coming to the Pennsylvania meeting, and seeing so many of my old friends. My joy is dampened by only one thing, and that is the necessity of leaving tonight for Chicago. My paper will, therefore, of necessity be brief.

Prof. Hayward's paper was as follows:

# PORK PRODUCTION IN THE EAST.

## By Prof. Harry Hayward, Director Delaware Experiment Station

That pork production is an important agricultural industry is shown by the fact that, in the year 1900 the average private family ate a little over half a ton of meat, nearly half of which was pork. In other words, the total amount of pork consumed in the United States is nearly equal to the total consumption of beef, veal and mutton.

These facts are explained by another fact and that is, pigs for various reasons are more profitable animals to raise than beef, steers, or sheep, and on this account always have, and probably always will occupy a prominent place in American Agriculture. Of the reasons which tend to make pork production profitable, a few of the most important may be of interest. In the first place, pigs are more prolific than any other class of farm animals, they mature more quickly, and can therefore be turned off sooner than any other live stock save poultry. Again, a pig produces its meat upon considerably less feed than any other meat producing animal, much of which, moreover, could not be used advantageously in any other way. A pound of pork can be produced upon half the amount of feed that is required to produce a pound of beef, and two-thirds as much as it requires to make a pound of mutton. Still another point in favor of the pig is, that the percentage of dressed weight is higher than in either beef or mutton. The average fat hog will dress about 80 per cent. of his live weight.

There is probably no branch of Animal Husbandry which can be taken up with such a small outlay of capital as raising pigs. They can be kept in comparatively large numbers, in small inclosures, or they will do very well on pasture which furnishes a part of their feed, and they are subject to but few diseases. As our population increases the demand for pork on account of its palatability and nourishing qualities probably will also increase, and it is to discuss some of the questions that will arise in meeting this demand that this paper has been prepared.

According to the last census Pennsylvania has a little over a million head of pigs, while states like Illinois, Louisiana, Indiana and Missouri have from three and one-half to ten millions. If these states that are so far from the markets find it profitable to produce pork, why can not the Pennsylvania farmer make it more profitable, since he can grow about every kind of crop that the farmer farther west can produce, and has one of the best markets in the United States at his very door?

With the prices of dressed pork hovering around the nine cent mark, I am strong in my belief that the farmers of this state can well afford carefully to consider the feasability of making pig raising on a moderably large scale one of their principal sources of revenue. I have had enough experience in handling a herd of from one hundred to two and fifty head to believe that this is one of the easiest ways in which the eastern farmer can solve the labor problem; a very serious matter just now on most farms.

If a farmer is inclined to make pork production a large factor in his farm economy, he should make his plans carefully, and be sure of his ground in order to forestall subsequent losses and disappointments.

In view of the knowledge we now have, few would think of trying to grow pigs even on a moderate scale without the use of the pasturing system unless located near a city where garbage is available. This system calls for a very small area of tillable ground per head, which in course of time should become richer and more productive by the use of legumes and the dropping of the animals. Considerable thought should be spent in planning the layout of the yards and lots that the maximum amount of work may be done with the minimum amount of effort. The buildings should consist of a store house or granary in which could be stored at least a car-load of feed such as bran and a root cellar. Beside this, there should be half a dozen or more small farrowing pens that could be warmed in case of sows farrowing in very cold weather. These buildings could be arranged in relation to the feed and pasture lots so that they could be easily reached with a car running on an overhead track. While such a plan will slightly increase the initial cost of a pig raising plant, it does away with the necessity of carrying the feed by hand, which is out of the question where as many as fifty hogs are kept, and not only does away with the expense of a horse and wagon, but the feedways are not cut up in wet weather, thus eliminating a disagreeable feature of most piggeries. With a little thought in arranging the overhead track most of the lifting, and much of the unpleasant sloppiness so prevalent around hog houses can be avoided. With an arangement of this kind one good man will be able to feed and care for from three to four hundred pigs. In regard to pig houses, experience has demonstrated that the Lovejoy house, eight feet square, made of rough hemlock boards well battened, is very satisfactory in most climates. These houses will accommodate about eight two hundred and fifty pound hogs, will answer as farrowing pens in moderate weather, are cheap, and in case of an outbreak of disease can be thoroughly disinfected or even burned without much expense. Too much care cannot be given to the fences on a big farm, as a breachy pig is as bad as any other farm animal that acquires the habit of breaking out. The best fence is of boards, but on account of the high price of lumber, such a fence cannot be considered, if one wishes to practice economy. The most practical pig fence perhaps is one of fairly heavy woven wire from 26 to 30 inches high, with a strand or two of barbed wire stretched above it.

If a fence of this kind is put up carefully so that it will be tight, the posts braced firmly, and the bottom of the fence stapled to stakes or small posts firmly set in the ground between the posts it will be pig proof and should last a long time.

### The Selection of a Breed.

From an economic point of view one will find upon studying the results of breed tests at a number of Experiment Stations that certain breeds do not produce pork uniformly so cheaply as do other breeds. On the other hand I do not think this difference great enough to offset one's own personal likes and dislikes in the matter of breeds. I think it true that as yet few, if any, of our markets distinguish enough in price between the so-called lard and bacon type of pigs to justify a preference for either type from a market standpoint. On account of the reasonable price for which pure-bred sow pigs can be bought, and as a pure-bred male is essential to success in any case, it seems reasonable to advise the use of pure-bred pigs rather than grades in general pork production. It costs no more to grow the pure-bred animal, and with but little care one may easily dispose of a pure-bred pig at two months of age for as much as he can get for a fat grade pig at eight or ten months of age. The more popular the breed selected the more easy will it be to make satisfactory sales of breeding stock. Go slowly on new or unfamiliar breeds. Few breeders are able to popularize new breeds so as to make many or good sales.

### Feed and Care of Breeding Stock.

In feeding brood sows there are three points that should be constantly borne in mind. First, to supply the nutrients necessary for the proper nourishment of the sow, and the litter she is carrying; second, to make the ration bulky enough to keep the system open and in good condition, and third, to make it as cheap as possible. During the growing season such a ration can be supplied at a minimum expense by feeding about two per cent. of the sow's weight of three parts corn and one part bran or middlings, tankage, soy beans or cow peas, the remainder of the ration being supplied by allowing the sow to run on clover, alfalfa or some other leguminous pastures. In winter cut clover or alfalfa hay mixed with the grain, together with a sugar beet or two or mangels will make a good substitute for the pasture. The sows as well as the boar should have abundant exercise, and in placing the houses in the lot where the pigs are confined care should be taken to plan to have the feeding place as far from the sleeping quarters as conditions will allow, so as to enforce exercise in cold weather.

In order to have the pigs ready for an early market in the fall they should be farrowed in March, the earlier in the month the better. If the sow's next litter comes the first of September, they will be in good shape to market the following April when prices are nearly always good. In this way the brood sows produce two litters a year, and by a little extra care they are ready to sell when the market is usually at its best.

It requires considerable skill to start young pigs without skimmilk, and keep them going until marketed. The faster they grow within reasonable limits the greater will be the profits. One of the important factors in this connection is the sow herself. Unless she is both a good feeder and a good milker, no matter how skillful her care may be satisfactory results can not be obtained. On the other hand given an ideal brood sow unless the feeder is a pig man, he will not be able to feed the sow with the cheaper foods in such a way as to make the sow give her maximum amount of milk and make it agree in all cases with the sucking pigs. Henry has demonstrated that it requires no more food to produce one hundred pounds gain in the pigs when fed to the sow and pigs before weaning than when fed to pigs alone after weaning. This fact would seem to indicate that the more milk the sow can be induced to yield the more rapid will be the economical growth of her pigs. If skimmed milk is available at this time, the difficulties attending the feeding of the brood sow while nursing her pigs are materially lessened. The milk should be fed with grain enough to make a fairly thick slop. Light grains such as white middlings, red dog flour, ground oats with a little corn meal being preferred. Henry also found that it required 230 pounds of mixed grain and 530 pounds of skimmilk to make 100 pounds of gain in young pigs under these conditions at a cost of about $3.35. If, however, skimmilk is not to be had, a mixture of two parts finely ground oats with one part of wheat bran and one part white middlings with five to ten per cent. of tankage allowed to soak between feeds is a satisfactory ration; to assist in keeping the system open a few roots or access to pasture is desirable.

At the age of about three weeks the little pigs should be encouraged to eat by scattering some shelled corn on a clean floor, or by allowing them access to another pen, or a shallow trough of milk into which has been stirred a few middlings. From now on until they are weaned, their food should be increased and strengthened, care being taken that they have plenty of exercise that they do not become too fat.

At the age of eight week the pigs should be ready to wean. This is a crisis in the young pig's life, and the skillful manager will see to it that the pigs are not checked in their development at this time. This can be done providing they are kept warm and dry, that their food is suitable, palatable and properly prepared, and that they are not over-fed at any time. If they are never given quite all they will eat their appetites will keep keen and thus they may be made to eat the maximum amount of food to the best advantage.

From the time the pigs are weaned until they are shipped, the question is to produce the greatest gain at the least expense. This involves not only keeping in close touch with the feed market, selecting the cheapest one and buying when the price is low, but it also involves a knowledge of how to blend the growth producing and fattening foods in such a way as to get a pig large enough to weighs from 225 to 250 lbs. when about eight or nine months old.

It is probable that in no way can pork be made more cheaply than with grain on pastures, provided the grain and the pasture is of the right kind. Experiments at a number of different stations have shown that it requires from one-fifth to one-third less grain to produce one hundred pounds of pork with pasture than without it. While this is no doubt true, care should be taken not to try to over do the matter of pasture, especially with young pigs. Young pigs need more protein than older ones, because they are growing rather than fattening. In consequence, the young pig should receive for some time after being weaned a ration equivalent to two parts of corn meal and one of middlings, with a little tankage perhaps aside from access to good clover, alfalfa, oats and peas, or cow pea pasture from which he will get considerable protein. On this sort of pasture, as the pigs grow larger, the proportion of corn may be increased until they have attained the weight of about one hundred pounds, when corn alone may be economically fed, unless perchance corn may be high and protein feed proportionally low in price. Under usual conditions, however, the nitrogenous feed are so high that, although their use undoubtedly would make more rapid gains, they are obtained at such an increased cost as to render their use inadvisable. Pigs should be so fed that they will gain from one-half to one pound a day from the time they are three weeks old until they are marketed. It is impossible to make anything like this gain on pasture alone, but on the other hand the Montana Station has found that it is possible to feed more grain than is necessary to make the maximum gains. It seems, too, that in order to get the best results from the pasture it is essential that the pigs be allowed to graze rather than to have the green feed cut and brought to them. Whole grain fed on pasture should be ground or soaked with the possible exception of corn, which may be fed on the cob or shelled. It will pay, however, to soak old corn before it is fed, as soaking is equivalent to grinding and is much cheaper.

It was further found at the Utah Station that pigs in pasture consisting of about half alfalfa and a full grain ration gained 1.3 pounds per day, and that 417 pounds of grain were required for 100 pounds of gain. In pasture and three fourths grain ration the daily gain was 1.2 pounds and 377 pounds of grain required for 100 pounds of gain. On a half grain ration the daily gain was .87 pounds and 352 pounds of grain required for 100 pounds of gain. Another rather peculiar conclusion drawn from the Utah Experiments was that exercise alone increased the gain 22 per cent. and the amount eaten but 1.5 per cent., but decreased the amount required for one pound of gain 22 per cent.

It requires considerable skill and forethought to arrange to have desirable pasture available during the greater part of the growing season. Assuming that the land devoted to pig pasture is fairly fertile, the following plan will perhaps yield satisfactory results under average Pennsylvania conditions where alfalfa is not as yet a certain crop:

The earliest pasture that can be had is rye, and although its food value may not be great, it will serve to tone up the system and induce better appetite and faster growth. Hairy vetch, red clover, oats and peas, rape, gem sorghum, soy beans and cow peas may follow each other. Climate, soil, and other conditions will probably serve to exclude some of the crops. It is quite certain, however, that from this list a rotation may be had that will give anywhere in Pennsylvania a succession of suitable pasture for hogs. The great advantage in supplying such a course of pasture is that many of them supply in a very cheap manner protein which is needed for rapid and economical gains.

### Winter Feeding.

Growing pork in the winter months is a little more expensive than it is in the summer season. However, we have never had pigs do better than during the winter in open feed lots with Lovejoy houses for shelter. In winter as in summer the ration for growing pigs should contain considerable protein, although not so much is needed in cold weather perhaps as in summer. It has been found that for the most economical gains in pigs the nutritive ratio should be about 1:6.5. Then nutritive ratio of corn is about 1:10. A part of the winter ration can well be composed of alfalfa or second growth clover hay, cut fine and mixed with meal, or in the case of brood sows be fed from racks.

In some experiments in Nebraska a ration consisting of 80 per cent. corn meal and 20 per cent. chaffed alfalfa produced as much gain as a ration of 80 per cent. corn meal and 20 per cent. middlings. Sugar beets or mangels fed raw in mild weather and cooked in freezing weather can also be used advantageously in winter feeding. Not so much on account of their nutritive value, as their value to keep the system in such a condition as to increase assimilation.

In regard to the difficulties in growing pork in the East or anywhere else they may all be summed up in the one word—sanitation.

The sanitation of the piggery should be guarded as carefully as the sanitation of a hospital. Damp and illy ventilated sleeping quarters are fatal to pigs and unless the owner will see to it that his hogs always have a dry and well ventilated place to sleep, he had much better keep out of the business. Overcrowding is an evil in pig growing that must be guarded against.

It is my firm belief that at least half, if not more, of the outbreaks of disease are due to overcrowding young shotes. The younger and weaker ones become so unresistant that finally they succumb to the germs of the cholera or swine plague, which I understand are always present even in very healthy pigs. It is simply impossible to crowd young pigs and this point cannot be too strongly emphasized.

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President Norton: We shall be pleased to have this paper discussed briefly.

Mr. McSparran: I would like to ask the Professor whether he has ever experimented with linseed meal as against tankage?

Prof. Hayward: Yes, sir; I have; I think tankage is cheaper.

Mr. McSparran: That is the point I want to make—because it is cheap.

A Member: What is tankage?

Prof. Hayward: Tankage is a mixture of ground meat and dried blood which is being put out by slaughter-houses, and is largely used for feeding hogs, particularly in the middle west—in Kansas and Nebraska.

A Member: What proportion of it would you feed?

Prof. Hayward: About five per cent.; it depends largely upon the size of the hogs.

A Member: I want to ask whether the by-products of the farm would not answer as well as the tankage you buy in the city?

Prof. Hayward: Yes, and be cheaper, too, although I think the tankage put on the market by Armour and Swift is an excellent thing.

A Member: The by-product of hair is all taken off?

Prof. Hayward: They burn that off.

Mr. Hargett: You must excuse me, for I am a stranger; I am from Maryland and have farmed all my life, and I know a little of everything and not much of anything, but I want to say that this by-product of hair is one of the best things we have ever tried for growing potatoes. After planting the potatoes lay the hair over them and note the result.

A Member: Will the potatoes have hair on them?

Mr. Hargett: No, sir.

Secretary Critchfield, (from the bald-headed row): I guess I must have been planting potatoes.

Mr. Hargett: Now, Mr. President, this is not an evolution of my own, but we had a lady from California visiting us who is very fond of flowers, and she told me that her Chinese servant insisted that the hair that came out in her combings would make her plants grow; to satisfy him she tried it, and they grew wonderfully. Now, I thought that idea might be applied to the potatoes, and I have used it with remarkable success.

Mr. McSparran: Does the Secretary's wife raise flowers?

Mr. Mr. McCreary: I would like to ask the Professor what he values skimmilk at per hundred pounds.

Prof. Hayward: I have always thought it worth about twenty cents if fed to hogs weighing under twenty-five pounds; if fed to hogs weighing over twenty-five pounds it is worth more than that.

Secretary Hayward: What do you figure the pigs at?

Mr. Bayard: Pure-bred hogs are worth from $100 to $300.

President Norton: Any more questions? If not, we will take up the next subject, which is an address by the Hon. W. M. Hays, Assistant Secretary of Agriculture of Washington, D. C.

The address of Mr. Hays is as follows:

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## AGRICULTURAL EDUCATION

### Address of Hon. H. W. Hays, Assistant Secretary of Agriculture, Washington, D. C.

Ladies and Gentlemen: I am glad to be with you tonight, and I am proud to be with you. I am proud of your great state. I have been living near it recently, and have become better acquainted with it. In my boyhood days I heard much about it from my Pennsylvania German relatives, but it is only recently that I have become personally acquainted with it, and have learned from my own observation how great it really is.

I have just learned from your Secretary this evening that I was down on the program for two speeches. I did not know I was expected here las evening. I received the program with a red pencil mark over Wednesday, the 23rd, and supposed I was to be here for this evening only. I don't know whether the mistake was made at my office, or whether it is to be credited to your Secretary. (Secretary Critchfield says it must have been made at the Washington office, as they use blue pencils here). Well, if that is the case, I am sorry for it, and will have to try to cover the two speeches in my address of this evening.

As each hour has its duties and each tilting of the world's axis has its seasonable work, so each decade brings up for solution its own problems. Our country has taken up one after another such political questions as self-government, freedom of speech, the freeing a race of slaves and the curbing of dominating capital. In education the first forward movement was to secure private schools, then came the movement for free primary schools. The establishment of academies and colleges followed, to be in turn succeeded by a movement to establish free city high schools and normal schools; olso state colleges and universities partly or quite free of tuition charges. Each of these types of schools has been devised to form a wheel in the educational machinery which we, as a people, are gradually perfecting.

The educational philosophy of the older, church-governed schools which long ruled our educational policy has been powerfully modified by research in the sciences and by development in the industries, arts and professions. The curriculum once confined to classical learning has broadened out so as to cover the practical as well as the theoretical and the aesthetic. Some of our very best philosophy of education is now found in the minds of those teachers who are successfully reducing to pedagogic form and weaving into our educational scheme the essentials of education in the industries and home-making. When the older philosophy met the problems of technical education it said: "Educate the man first and the specialist afterwards." Its plan was to give the man a general college course and give him his technical work in a graduate course. That plan limited technical education to college men. It was the aristocracy of education for the few in the professions. If that philosophy had been persisted in it would have been the most un-American of foibles. The persistency with which this mistaken policy was pursued was due almost wholly to the fact that school teachers cling most tenaciously to the educational philosophy of the schools where they were taught. Among the most intolerant things done in American life stands out the persistency with which our educators go into a new community and disregard the local interests important and dear to the parent and pupils, placing the school emphasis too nearly all on the remote, as on the possibilities of becoming President, or on the language of a people who knew far less than we, failing to give the youth information about the things with which he or she must deal. But far worse, this course tends actually to rob the pupil of his or her inspiration for the practical affairs of the home, the farm, the shop, or other work in which at least 90 per cent. must engage.

The broader plans coming into our schools have been largely thrust upon the school men by men of affairs, as in our cities, and by legislators. The success of combining industrial, technical, and scientific studies with the general studies, thus brought about, often under suggestions from school men, shows that the philosophy of many of the older educators was wrong. The Congress of the United States by passing the land-grant act of 1862 establishing State colleges of agriculture and the mechanic arts, did more than all other agencies to broaden the philosophy adhered to by the older schools. At first the mechanic arts were brought to a pedagogic basis; then agriculture slowly but surely was brought to teachable form; and last, home economics were successfully brought into the domain of the school. I believe there are now no administrators of these colleges who are so conservative as not to be thoroughly in sympathy with collegiate education in engineering; most of them have risen to a belief that agriculture has been reduced to teachable form; but some still have little faith in the possibility of teaching domestic subjects. Legislative bodies, ever more ready than teachers to turn our schools into practical lines, have their minds open to larger plans for public education. These men who see the broader economic and social movements of our country and our States have come to believe profoundly in scientific, technical, and industrial education and research in relation to our productive industries, in relation to home-making and in relation to our social and civic life. As the management of a great railway system is willing to make expensive surveys preparatory to the proper construction at not too great cost of proposed improvements in order that larger net profits may accrue to the road, so our legislators are ready to have the people's money collected and expended in making the people more efficient in creating and enjoying wealth.

The new school movement springing out of the Congressional land-grant act of 1862 offers some facts of interest to legislators and to all who are interested in our youth. These colleges (figures of white pupils only available. Colored schools relating to the industrial are mainly of secondary grade), with 12,334 students in engineering courses, 7,272 in agriculture, and 854 in home economics, most of whom are competing for collegiate degrees, cannot offer their training in practical studies to more than a very small number of the 26,000,000 school children of the country. All will agree agree that inquiries should be made concerning the best way to supplement these colleges, so as to carry this education down through all the schools, so as to carry instruction and inspiration into all three practical lines of effort to all our youth. As an outgrowth of the engineering departments of these State colleges, instruction in the mechanic arts has been very successfully introduced into the numerous city high schools of the country. Evidence of the utility of the mechanic arts city high school is arising from the effect they are having on the mechanical industries. Manufacturing firms, for example, are seeking in these schools the young men and young women who show an aptitude for expert work, a genius for invention and new construction. an instinct for managing men, or abilities for promoting and conserving financial affairs. As a result of the agricultural work of State colleges more than thirty of the needed two or three hundred agricultural high schools have been organized by the different states, two having established one such school in each Congressional district. Home economic education, first organized in agricultural colleges, is rapidly spreading into all city high schools, agricultural high schools as well as privately endowed schools of secondary and higher grade and even into primary schools. In towns and cities too small to establish separate mechanic arts' schools, more or less mechanical and home economics instruction is introduced often as elective subjects in the regular high school courses of instruction.

The little rural school, so long the most backward in catching step with modern progress, is beginning to take new form. Education in agriculture and home economics once it is fairly started toward all farm boys and girls promises to be too strong for the conservatism of even the isolated rural school. These schools have amply demonstrated that in their present form they can not properly handle these two new lines of work. It has been shown that they need to be born over into new life which will fit them for their part—a most important part in the evolution of modern agriculture and modern home-making. The one-room school must become the four-room consolidated school, so that a man trained to teach agriculture and a woman trained to teach home economics may here find that fair wage and that long tenure of office which will warrant them in thoroughly preparing for their important tasks. The faculty of four or five teachers can conduct a ten-year course extending through the eight primary school years and two years of the high school for the 150 children from as many farms in an area of 25 square miles. The cottage of the principal; the plantations of timber, fruit, vegetable and ornamental plants; the plots for field crops, fertilizer demonstrations and farm management lessons; the laboratory and practice room; and the vital connection the teachers can have by co-operating with parents in the work on the farms and in the homes will weave strongly into the pupils' nature the elements of a true education in country life. With the schools thus organized there is provided in the country a far broader child-life than has yet been conceived for city youth. How can the nation better expend some of its wealth than by thus making provision for well-nigh ideal conditions of fatherhood and motherhood in our country homes? Two hundred of the needed 40,000 consolidated rural schools have been established, and practical studies in agriculture and home economics are slowly but surely finding their places in them.

Education in the city industries in agriculture and in home economics having become successful elements in our public education it is not too early to inquire how they may best be brought freely to all American youth. No one can doubt that the introduction of these subjects generally into the secondary and primary schools will materially increase the cost of our public schools, nor that this added cost will several times over return in the greater earnings and in the better homes of the coming generation. Those who have most closely investigated the subject believe that the general adoption of industrial education is in the same category as were the adoption of the steam engine, the self-binder and the sewing machine. The vast expenditures of these mechanical inventions would have seemed more appalling fifty years ago than would now the added cost of industrial education. Our scheme of education for city life is rapidly taking form for the non-agricultural classes in our tripartite system of primary, secondary and higher schools. The great bulk of this work provided for by public taxation is organized under an articulated system of eight years of primary, four years of secondary or high school, four years of collegiate work with one or more added years for graduate courses. The privately endowed schools of primary and secondary grade are no longer rapidly increasing their numbers nor their income, though their value is and will continue to be second to that of the rising public school system. Persons with private funds to give to good causes are more and more recognizing that public funds are to carry the main burden of primary and secondary schools. Even the colleges and universities of non-public character are meeting most powerful rivalry from State colleges and State universities.

The city youth early gains a position on the educational ladder, and with the hope and enthusiasm of youth he looks and climbs upward. The system ever leads him on as if all could find occupation at the top. But necessity to labor for sustenance and other causes compels or induces 98.6 out of a hundred (from statistics of attendance in private and public schools and colleges throughout the United States in the 1904 Report of the United States Commissioner of Education) to stop short of the college ladder, and 9.4 out of a hundred to stop before leaving the primary ladder and labor in the fields, shops and homes. Higher education is very important; secondary education even more important; but the great work of the schools must be done in the primary schools. The main function of our secondary and higher schools is clearly to prepare teachers for the primary schools.

The city-life system of education will prepare those who are to coninue on their educational course none the less well if the lower schools devote a fair amount of their time to education relating to the sustaining industries. And there will be a far better self-selection of those who are to continue in school that they may prepare for the pulpit, for the bar, for the teacher's chair, or for the engineer's or technician's post. The wider experience of the pupil who tests his own powers and interests with the natural, industrial, and home-making objects and subjects will enable him earlier to find himself; so that fewer mistakes in choice of a life vocation may be made.

When our city secondary schools freely offer to all pupils training in the mechanical industries and in home economics, teachers will be trained who know the educational value of these subjects from the standpoints of scholarship, mental power, industrial skill, and broad, practical citizenship, and who can successfully introduce these subjects in an elementary way in the higher grades of all our city and town primary schools. Clearly there is no need in the curriculum and plan of our city high schools for instruction in practical subjects that those who are to be teachers of our lower schools may have knowledge, interest and inspiration regarding these broad fields of industrial and household work with which most of the people throughout their lives must daily deal, and that very many leaders with higher standards of skill and efficiency may be provided for all our industrial and home-making work. Laborers trained in their work, however simple; artisans skilled in their expert labor; technicians schooled, specialized in their duties; foremen, managers, and heads of manufacturing, transportation, and commercial enterprises made alert to see the inter-relations of industrial processes—the web and woof of our great non-agricultural industries—will make splendid use of a far more highly developed practical school training than our country now provides them.

Country-life education has not had the advantage of centralized population and wealth. It has not developed the needed leaders. Its problems have been more difficult; its organization has been more slow. While the State colleges of agriculture and mechanic arts were designed by Congress to keep agriculture and our splendid country life at the front, some of these institutions failed for a quarter of a century and more to make a success of their agricultural instruction. Many causes operated to retard the successful development of collegiate courses in agriculture. General education requiring only class rooms, chairs, blackboards and books and scientific education requiring in addition only laboratories became first installed in many of the institutions and long held the chief place in the minds of college presidents and boards of trustees. Entering vigorously upon agricultural education necessitated the additional expenditures for practice labratories and practical work on the farm, and for expensive herds of live stock and for other costly equipment. The collegiate faculty most of whom were educated in the older schools could not resist the temptation to enter a race for large number of students with general colleges, thus hoping to gain favor with legislatures, and most of the funds were used for courses which could easiest be made popular. Following the ideals of the older educators, the technical and practical studies in agriculture were at first put toward the top of the collegiate courses. The assumption now proved erroneous that the farmer should be afforded as long a course of college study as persons preparing for technical professions. At first there were not so many positions open to the trained agriculturist as to the graduate of the general and scientific courses, which became popular as preparatory college courses for those desiring to take their graduate work in law, medicine and other professions. Lack of a substantial body of agricultural knowledge and business principles in pedagogic form were also at first a very great hindrance to the development of education in agriculture.

The engineering courses of these colleges on the other hand had less to handicap them. In the various lines of engineering a definite body of knowledge and practice work was early brought together in splendid form for teaching. The rapid growth of industrial, transportation, and merchandising enterprises afforded large numbers of salaried positions, paying even better wages than positions to which general and scientific collegiate courses led. Students seeing the halting and unsatisfactory character of instruction in agriculture, naturally flocked to the courses of study which seemed to give them individually the best opening. Presidents and boards of trustees traveling the lines of least resistance responded to the development of general and mechanic arts' courses and failed to secure from the legislatures the large necessary equipment for agricultural education.

During the last one or two decades one State College after another has succeeded in bringing forward its agricultural instruction, and today success has been reached in a large proportion of these institutions, giving assurance that this class of collegiate education has a grand future.

Success had hardly been attained in collegiate courses in agricultural education when secondary schools for agricultural education began successfully to develop. In 1888 the University of Minnesota began an experiment at developing an agricultural high school course. This experiment is of none the less value, and of all the greater interest, because it was an outgrowth of the failure of agricultural courses of collegiate grade to gain a foothold in a State university. Just as Congress by its land-act grant forced colleges of agriculture upon the states, this agricultural high-school movement was injected into the school system upon the initiative of farmers and business men. At present between thirty and forty agricultural high schools have been established in the United States.

In one line of country-life education school men and non-school men have together taken up the practical in school work. Farmers and educators together have entered upon the development of rural schools, as to have them cover agriculture and home economics as well as the Three R's. Thus the school people are especially championing the consolidation of rural schools, and the farmers are laying stress upon the introduction of agriculture into all rural schools. Both classes are rapidly coming to favor both propositions. The farmers are coming to see that agriculture can not be successfully introduced into the one-room rural schools, and the teachers are coming to see that agriculture and home economics are to have very strong positions in the primary country-school curriculum alongside the Three R's.

The need of a unified system of agricultural education with rural schools, agricultural high schools and colleges of agriculture, articulated throughout as are the three classes of primary, secondary and collegiate schools devoted to the education of the city or non-agricultural classes, is gaining wide recognition. Courses of study for agriculture and for home economics covering the sixteen years of primary, secondary and collegiate work have been been designed, demonstrating that a unified system of education can be built up for country people, and for the professional or technical classes needed in building up the rural industries. To develop country-life education as instruction for our city people is developed, two important changes are necessary. First, there is needed in every rural Congressional district an agricultural high school with capacity to accommodate several hundred students, and second, rural schools should be consolidated. In these two points unanimity of opinion is being slowly but surely reached by those who have paid most attention to this subject; and the next large public expenditure for education made by the American people should be for the consolidation of our rural schools, the development of agricultural high schools, and the development of industrial work in our country-life and in our city-life schools.

It is easy to believe that if a way appeared whereby the necessary funds could be provided, all would agree to these important developmental changes. Our farmers say that they cannot afford the expense of discarding the little rural schools and erecting fine central school houses and assume the additional annual expense of hauling their children to and from the consolidated school. Our States even in these prosperous times feel conservative in appropriating the money to equip each of several agricultural high schools and the money necessary for the current expense fund of each such school. Our cities and towns during the period when their development expenditures for streets, sewers, waterworks, and general school buildings are large do not feel that they can add to their budgets large items to equip and maintain instruction in mechanic arts and home economics. The States and cities argue that even if free industrial education would pay the community, its cost is more than their present financial ability will warrant.

Investigations to discover how best to finance movements to improve the condition of our farmers, our city workers, and our home-makers have led to the discovery of a fact worthy of the most serious consideration. In its early days, the country being small and jeopardized by external foes, the General Government received the right to levy indirect taxes as on imports, on alcohol and tobacco. The states and the lesser political divisions on the otherhand raise their revenues by more direct taxation as on personal property, on the incomes of corporations and of individuals and on inheritances.

It so happens that since the General Government and the State were allowed these sources of income vast economic changes have taken place, placing the Central Government greatly at an advantage as compared with all the States combined in securing taxes. With the enormous development of manufactured products and the increased power of the people to purchase them, and with the greatly cheapened transportation resulting from the circulation of vastly greater quantities of commodities, the revenues obtained by the Federal Government have enormously increased. The States on the other hand find it impracticable to secure such large amounts of public revenue from the more direct forms of taxation. This is clearly illustrated by the fact that the Federal Government thus secures in taxes revenues amounting annually to $800,000,000. This is $10 per capita, or nearly $50 per family. The States on the other hand annually bring into their State treasuries only $2 to $3 per capita, or about $200,000,000. It should be observed that revenues derived by cities, counties, townships, and other political bodies make the State and local taxes presumably somewhat larger than the Federal revenue. The fact that the State legislator is often chosen under pledge to keep down State expenses, while the Federal legislator is expected to secure all he can get for his State from Federal appropriations has not a little to do with the relatively larger growth of the Federal budget.

It may be of interest to note that this centralization of revenue in the hands of the General Government is a great force in centralizing governmental power, and if the people had less education or lived in a time less democratic this vast sum secured from indirect taxation might be a fatal danger. On the other hand modern conditions require immense strength and resources at the command of political administrations which every four years must depend for their power upon the vote of the entire people. Not only the outside forces with which our Government might come in conflict, but the vast centers of financial and political influence within the country are gaining such mammoth proportions that the people as a whole agree that a strong government is required that it be more powerful than any rival external or internal.

The productive industries of the country yearly provide the $800,000,000 which goes into the Ferderal treasury. If the workers were better prepared for their tasks they could easier provide still larger public funds. Since states, cities and counties and small school districts are handicapped by direct and less popular methods of taxation in securing school funds with which to pay for the expensive work of providing education in the industries it would seem legitimate to use a small part of the national budget for that purpose. Congress has thoroughly established precedent along this line by passing the agricultural college land-grant act of 1862, followed in 1890 with a direct appropriation of $25,000 to each state for education relating to the industries of the state colleges—thus by gift forced on the people.

It has been proposed that Congress offer to each rural congressional district $10,000 annually toward the support of an agricultural high school. In 1887 Congress gave to each state $15,000 for agricultural experiment work, and in 1906 this amount was made $30,000 for each state. It has recently been proposed that $2,500 be offered by the Federal Government toward the support of a branch experiment station at each Congressional district agricultural high school.

It seems only proper to carry the suggestion one step further and suggest that Government aid should be extended also to industrial education in mechanic arts and home economics in the city and town high school. Under this plan a Congressional law has been suggested under which, say, 10 cents per capita, or a total of $8,000,000 annually might be apportioned to agricultural high schools and to city high schools. The payment of this fund from the Federal treasury could be conditioned on the State supplying the necessary lands, buildings, and equipment, and on the appropriation by the respective states of sums equal to their allotment from the General Government. The law could be made to stipulate that the Federal fund be used only for actual work in classes devoted to the industries and domestic work.

That some comprehensive scheme of financing industrial education is necessary can hardly be doubted by those acquainted with those communities most backward from an industrial standpoint as in the South and West, and in thinly settled districts as in mountainous regions.

Even Pennsylvania would receive an impulse of vast importance from a measure of this kind. Such action on the part of the Federal Government would be of untold benefit to the country people of this state. Her manufactures also would gain a new impetus from thus inaugurating throughout her high school system mechanic arts' education. Education in home economics thus made possible to every girl in the state would still further exalt home-making and motherhood in the Keystone State.

Taking round numbers from the Twelfth Census, Pennsylvania stands among the states second in manufactures only to New York. In agriculture she stands eighth. She has a total output of $834,000,000 in the mechanical industries and $207,000,000 in agriculture, practically four to one. She had 928,000 workers in mechanical industries and 341,000 in agriculture, practically three to one. In trade and transportation she had 454,000 workers; in professional service 103,000; and in domestic and personal service, 566,000. Of her 6,302,000 people there were of school age 2,031,000, or practically one in every three, half of which number, 1,084,000 were in school.

The figures are not available to show the school expenditure for the five classes respectively. It is conservative to estimate that the 103,000 professional workers have had school facilities from public funds and from private endowments equal to those provided to several times as many workers in the industries. Educators are rightfully urging that more money be supplied to equip the colleges and universities which devote their energies mainly to educating people for the professions. Indirectly by training teachers for the lower schools these higher institutions of learning have a very large influence in educating the workers. Colleges and universities have had their great day of promotion, and they have reached a point where their very substantial equipment and liberal support are assured. The professional class is about 5 per cent. of the whole number of workers. In education they appear as a privileged class. They should not be given less, but more; but the great movement now needed is to give of the world's rapidly accumulating store of technical knowledge to the workers and to add to this knowledge skill. There is now no line of work for which a technique is not being rapidly developed. In agriculture, in the mechanical industries, and in home economics the body of acumulating scientific, artisan, and art knowledge is being reduced to pedagogical form. Studies in this great triumvirate of practical affairs (mechanic arts, agriculture and domestic economy) are forcing in beside the Three R's, and the resulting sextette will so broaden out the knowledge, the industrial skill, and the productive and home-making efficiency of the whole people that every class will have a richer world to live in.

Pennsylvania has about one-fourth of her industrial workers engaged in agricultural pursuits with three-fourths in manufacturing and mechanical pursuits and in transportation. If Pennsylvania were provided with a fund from the Federal treasury equal to 10 cents per capita of the entire population. and one-fourth of it were put into technical education in agricultural high schools and three-fourths into technical education in city schools, and the state were required to expend an equal amount along these lines, the evolution of agricultural and mechanical trades and industries would be rapid, and the results to Pennsylvania's income and civilization would be both extensive and profoundly beneficial.

Mechanic arts' education thus extensively supported would result in much stronger leadership in the engineering professions and in the business management of Pennsylvania's industrial and transportation enterprises. Every boy in the state with strong instincts along any of these lines would then have the opportunity of the largest development of which his nature is capable. Ten agricultural high schools in the state, each provided with $15,000 from an outside source, and $15,000 from the state would send to the agricultural college course at State College, splendidly prepared, all the men the state needs to train in collegiate courses for professional work in its agriculture with a surplus for national service along this line.

These schools should graduate from high school courses a thousand of the farm youth every year or 35,000 every generation. Who will doubt that such a body of people trained in rural business and country home-making would not push Pennsylvania agriculture to altitudes not yet dreamed of? Would such an army of people trained in country-life education stop short of a splendidly organized system of a thousand consolidated rural schools and as many well-developed single-room schools in isolated mountain districts? From this body of young people what a splendid corps of teachers could be provided to install country-life education in these rural schools.

Under this plan a city of 100,000 population would receive $10,000 to which it would add at least an equal amount to be used in studies in the mechanic arts and in the household industries. Thus the city schools of Pennsylvania would not only grade up the efficiency of the industrial workers and home-makers, but would send to the mechanic arts' collegiate courses in State College, or at the University of Pennsylvania and other colleges offering engineering courses, young men better self-selected and better trained to go forward in their preparation for the engineering professions. Even the other collegiate courses of these institutions would be benefited by having a better selection of youth to enter the collegiate, scientific, literary, theological and related courses of study. Besides our modern conditions require that the scientist, the writer and the theologian know the practical sides of the lives of the people for whom they experiment, write and preach.

With large public funds thus provided for the practical in education, the less expensive but hardly less important line of education in home economics would receive the impetus it so richly deserves. No one who has had an intimate acquaintance with the developments of this line of education during the past twenty years will doubt the assertion that 10 per cent. of the large sums of money suggested for industrial education if applied to instruction in home economics in all the public secondary schools as thus suggested for city and country would easily bring back to the people more than the entire cost.

While Congress inaugurated industrial education; while Minnesota has the credit of designing a successful course of agricultural high-school work; while a number of our cities as Philadelphia, Brooklyn, St. Paul, St. Louis, Chicago and Menominee, have proven mechanic arts' high schools to be practicable; and while Ohio, Indiana, and other states have made practicable that most difficult of changes the consolidation of the rural schools; and while Alabama has the credit of being first to locate an agricultural high school in each Congressional district the great Southern state of Georgia has the proud distinction of first proceeding to finance a system of agricultural high schools throughout the state. Last July the legislature of Georgia passed an act authorizing Governor Terrell to locate an agricultural high school in each of the eleven Congressional districts of the state, and turned over the funds reserved as tag taxes on fertilizers and oils for their use as an annual support fund. The act required the people of the respective districts to furnish farms, buildings and equipments. Governor Terrell secured experts to aid in the selection of farms suitable for school and branch experiment station work. He employed an architect to prepare a bird's-eye view of campus and buildings, and he called upon educators who aided in devising a course of study devoted especially to agriculture and home economics, and articulating with the rural schools below, and with the farm, and at the same time leading toward the collegiate agricultural course in the University of Georgia.

The people of Georgia were thus so fully aroused to the importance of these schools that the bids of different cities and counties for them reached figures which put our rich Northern states in the shade. All but one of the eleven schools have been located, and what will be the bid of the last one is pretty well known. The total thus given almost wholly by individual subscribers for the 200 or 300-acre farms for buildings and equipments amounts to over $800,000—more than $70,000 with which to equip each school.

Is it any wonder that this magnificent response by the people of Georgia to his appeal to thus use modern technical education to bring still higher her rising industries and home-making led Governor Terrell to suggest to his Congressmen to secure a Federal grant for more money with which to supply to these schools and for a branch experiment station at each school a more nearly adequate annual expense fund?

America has no state more able than Pennsylvania to make a strong pace in the development of industrial education. Building up a system of education in the city industries, in agriculture and in home-making will cost additional funds. But the expenditures to make more efficient the producers of wealth and the home-makers who devote themselves largely to the development of people will pay back their cost several times over. Our statesmen and our educators have before them no more important problem than that of financing a plan of industrial education which is educationally correct. More experiments are needed that we may know how to develop industrial education. Of especial importance are experiments to determine how best to organize education in agriculture and home economics in consolidated schools. Pennsylvania's law passed several years ago providing for the consolidation of rural schools should furnish excellent conditions for such experiments. The rural school being far the most important of all schools devoted to country life should be studied by actual experiments. No other one object in agriculture is so much in need of investigation. Possibly legislative bodies and men in practical affairs must make the first move, as in the creation of agricultural colleges and as in financing agricultural high schools.

Mr. Chairman, I think I have talked too long. I am glad to be here and see the faces of men like your Secretary, Mr. Critchfield, whom I have just met, and of Dr. Armsby in whose class I used to be when I went to college (not that I mean to imply that he is old), and of Dr. Hunt, the man among all other men best fitted to the position to which he was called. I should like to say more about these people, but I have already talked too long, and I thank you for your attention.

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President Norton: Are there any questions to ask Mr. Hays?

Secretary Bayard: There are a number of plates of corn out there that we have no means of identifying. I think there are seventeen or eighteen specimens that have no identification whatever. I take it that the owners will know their corn, and wish they would identify it for us. We carefully made a record of every exhibit and then took off the cards when considering the corn in reference to the award of prizes, but I wish the people who have not handed in their cards would see me about it.

There are gentlemen here who are looking for Holstein cattle, and others who are looking for Guernseys. If the people who have these cattle to sell will see me, I will point out these gentlemen to them.

President Norton: The time has come for the demonstration of the milking machine, but we will not start it while Mr. Van Alstyne is talking. I wish no one would leave the room until he is through. It will be operated tomorrow at nine in the morning, half past four in the afternoon, and ten at night.

Tomorrow morning at the meeting of the Live Stock Breeders' Association, we will have an address by Mr. Alva Agee instead of the first paper.

The Creamery people are especially invited to the meeting of the Dairy Union, which will be held in the Education Department of the New Capitol—in Dr. Schaeffer's room. They will have butter-scoring demonstrations for the benefit of those interested in the making of butter.

We will now listen to Mr. Van Alstyne on "Rational Feeding."

# RATIONAL FEEDING

## Address of Edward Van Alstyne, Kinderhook, N. Y.

Mr. Chairman and friends: If anybody wants to go out, I will not be offended, because I think it is a shame to inflict another speech on this audience when it is nearly ten o'clock, but the Chairman has insisted on my speaking, so I shall have to do so.

I want to lay down three general propositions on the subject of feeding, and a great deal of what I say will be along the foundation which Mr. Fuller laid this afternoon. Some of you gentlemen have probably found out for yourselves much of what I am going to tell you, but it is those who have not progressed along the line of feeding as they perhaps should have done, that I want to help if I can, and the others of you will have to bear with me.

Our general purpose in feeding animals is to keep them in good condition. I want to make that emphatic, because from some things I expect to say you may infer that I would underfeed. I want, therefore to say first of all that we must keep the animal in good condition. She must be kept so for herself, and for our good.

To illustrate. take the matter of summer feed. If we allow, as we often do, the cow to run down in flesh during the summer, she will never do as well again until she builds up her system once more.

Then, do you believe in adding grain to the pasture? Now, my position on that point is just this: I am fully satisfied in my own mind that if we can add our forage crop to the pasture so as to keep her up in flesh and milk, we do not need to feed the grain. But even if in supplementing the pasture we keep up the milk flow, but lose flesh, it is better to feed grain, even if we do not get profit on our grain for the time being.

To illustrate—I speak of my own work, because I am more familiar with it than with any one else's—last year we did not feed grain during the summer, and along about September I noticed that my cows had lost flesh. There was no question about that; then I began to feed grain, and, friends, before the pasture of the next year, I know that I fed two fold more grain than I would have done if I had fed a little grain during the summer.

The next proposition I make is this: that there is a difference between feeding cattle for profit, and feeding them for production. "What" you say, "when you feed for profit, don't you feed for production?" Why, certainly not. Take, for instance, the Pan-American Dairy Tests. The people who had charge of the Holsteins and Ayrshires fed them from 16 to 18 pounds of grain every day in addition to plenty of good silage; and then they pointed with pride to the record of their cows, but at the end of the week, when the cost of their feed was taken from the value of this production, instead of standing at the head they went down fourth or fifth, and the second week was a repetition of the first. Then they saw they had to do something, so they gradually reduced the grain rations to 10 or 12 pounds, and at the end of the third week they had more profit on less milk and less feed.

I don't know how it is in Pennsylvania, but in New York, since the doctrine of protein has been preached, our folks find that they get more milk for the same amount of feed. In many cases the question with the farmer has only been "how many cans of milk can I carry away today?" They do not stop to think that they are carrying away the milk and carrying home the feed. When their check comes, the most of it has gone to pay the feed dealer and little left to pay the interest on the mortgage or buy shoes for the babies. They are feeding for production and not for profit.

Now, as to the character of the feed for our animals. Let us then proceed to the subject of the chart.

First, the green feeds, because they are the best, at the head.

Next, the dry fodders, feeds that are grown on the farms. It seems to me that one of the objects in keeping a dairy cow is to turn some of the raw, crude, cheap material, through the medium of the dairy cow into the finished product, and for that purpose it seems to me what we should use as much of our home product as possible.

Every farmer knows that the best feed to give his cows to make them produce milk is pasture grass, and if you will notice pasture grass is 80 per cent. water. Now, if you will put that cow into the stable, she will eat between 80 and 100 pounds of it, and do very well on that alone, and after you have satisfied yourself on that point, take this same grass and dry it and where you had a hundred pounds you have eighteen or twenty-five; now, you will take this same feed and give it to her with all the water she can drink and what will happen? She will get thin and dry up.

Now, we want that cow to be in a healthy condition in the winter, and if we have not the pasture grass on which she thrives, we can give her some other succulent feed. You will find here a line of green feeds, three-fourths of them water. You will notice, also, that the dried foods instead of having 75 per cent. water have less than one-fifth, and as the water is decreased the crude fibre is increased, and instead of 10 per cent. of it we have over 40 per cent.

In the dried stalks much of the starch and sugar which in green corn was digestible are tissued in woody fibre. So you will find roots which are 90 per cent. water. Any breeder of sheep will tell you that he will get more growth from less grain if he feeds roots.

What about the protein? It is necessary in these days to understand such terms as "protein" and "carbohydrates" and "potassium," and other words that were mentioned this afternoon. Well, we have learned to take them in as we have such words as "auto-car" and several more of these terms.

The protein is the element in the feed that makes the lean meat and the blood. If there is any man who does not understand this, I want to make it clear, if possible. This element in the food will do all this; it will make the lean meat and the blood, and you can't get it without it. The man who feeds it is building up the bone and muscle, but most of the feeds grown on our farms are deficient in it. Prof. Hayward has told us what he knows about growing the pig, and that he has to have a good deal of protein with his rations.

Now, we have a young heifer and we expect her to make a success as a cow, so we must give her the material to build up her body on, and she can't get it out of the starch and sugar in the feed.

Then we have the dry corn and there is where I think the farmer is making a mistake. Perhaps she is within a few months of calving and we don't expect her to give us much milk, so we do not feed her protein, but put her on coarse feed and fail to take into consideration the effect it will have in the development of that calf. Take a case of abortion at about seven months; most of them occur about that time, and I believe that many of them are due to the fact that she did not receive the necessary food element to produce the strength necessary to bear that calf. Unless she is properly fed, she will have to take from her own body to develop that calf and probably fall off in flesh. Now, I would not feed that cow during the last few months of pregnancy the same concentrated foods as when she is in full milk, but I would give her the cooling protein feeds that would give her the strength she needed. I have heard people talk as though there was no benefit in carbohydrates. Why, certainly there is; but the point is, we have most of them in our own feeds, and with this in view how can we bring it down so as to benefit us in a practical and economical manner.

What do we feed in the winter when we have no pasture grass? Well, we have the silage, which is succulent but deficient in this protein. I value my reputation, but I will stake it on this proposition: I will undertake to keep my cattle in as good condition on the silage, and get as much milk as on the dry stalks and two pounds of grain daily in addition. What does that mean? That I am to that extent free from tribute to the grain dealer.

While we are talking of silage, let me finish it up. The corn that we feed our dairy cows can be most economically fed in the form of silage, and I am satisfied that the corn is worth as much pound for pound in silage as it is in meal. In my country it costs about one-tenth to husk the corn, and we have to give the miller about one-tenth to grind it for us. There is one-fifth of the value of our crop. Furthermore, I believe if we add so much corn to our silage that our gutters are full of the corn it is a waste and an injury to the cow.

Now, if we go and eat a big dinner and on it go and eat a big piece of mince pie, see what happens. The same thing happens to the cow. I claim that if we feed our cow more than she can digest, it is a positive injury. I have fed the cows lots of good corn meal that was not necessary, and both the cows and I lost by it. I believe that not more than sixty bushels of corn per acre is as much as we can safely put into silage, when we give the cows all the silage they will eat twice a day. But when we have all the corn we need in the silage, it does nto pay to add corn to it in feeding. Then what are we going to feed with it? We must give that cow more protein, but where are we going to get it? Perhaps we have the corn stalks, which are high in fibre and heat forming elements but not rich in protein. We do not get it in the corn stalks, nor in the silage, nor in the corn meal, and I want to feed all I can of these because they are grown on the farm and are cheaper. But they are deficient in protein, so there is a limit to the amount we can feed.

Now, I keep a book into which I enter month by month, on one page the returns of my dairy, and on the opposite page the cost of the feed and I am much pleased with the results of my dairy until I turn the leaf and add up the cost of the feed, and subtract that from the returns of my dairy; then I don't feel quite so good. Perhaps you do the same, and I want to see whether we cannot learn to keep that cow a little more economically from the stuff that grows on the farm.

Well, then, we will take the clover, nearly three times as high in protein as the corn stalk, and nearly three times as high as the timothy. Now, my friend Wing is here from Ohio to preach the doctrine of alfalfa, and I am glad, because there is about eleven pounds of protein to the hundred pounds—nearly twice the amount as in the clover.

Take next the cheaper grades of bran and middlings which are upon the market. I agree with Mr. Fuller that the standard of bran and middlings has been raised the past few years. If you will cut your hay when the plant is half in bloom, you will get as much value out of it as from the hay that is allowed to reach full maturity with a pound of grain per day added. I will stake my reputation on that. You see that I am not recommending anything that will cost a big outlay of money on the part of the average farmer.

Now, what next? We take the Canada pea. I consider it superior to the clover, and next to the alfalfa as an economical milk producer. About two bushels of peas and one of oats makes a good mixture. But when the oat head is forming and the peas are in blossom, what next? Oats. I know of no feed that will put more stamina into cattle than oats will. They will not produce any more milk, but they will stay longer than wheat bran.

What next? Buckwheat middlings; very little fibre, but very rich in protein and very rich in fat. Where you are making butter in large quantities it has a tendency to make a soft butter.

Now, we have got through the list of farm products, but we must have more protein; so what shall we do? Usually we shall have to go out and buy. A man said to me sometime ago, "What is your balanced ration?" I said to him "I have not got any balanced ration," I am going to buy where I can get the greatest amount of food value for my money. I have been a great stickler for wheat feed, and I have said frequently, because I believe it, that a large portion of our rations should be bran or middlings because it makes bone. I know now that bran and middlings are not necessary for the cow, and how do I know it? I have eliminated it largely from my list for the last two years, and my cows are just as healthy as they were before. When a man asks me over $20 for bran, and I can for that money get something that has more protein, I tell him to keep his bran and I will keep my money. What about bone material? If the food is deficient in it, feed a couple spoons full of bone meal daily. I find that malt sprouts and brewery grains, which are made from barley, will not hurt the cattle in the least; and these by-products of the brewery are cheaper and better than a like amount of the wheat feeds at the same money.

I don't buy the starch by-products and I need more protein, so what am I going to buy? I don't want to buy crude fibre, and if in some of these mixed feeds, when a man comes to buy them, he finds he is feeding—What did the Professor say this afternoon—twenty per cent? I think one of them ran up to fifty per cent. of it, and it is not a notion, but, friends, some of these feeds are sixty per cent. fibre. But I must have more protein, and I will buy where I can get the most digestible material for the least amount of money. I don't know what it will be next year, but I know what it is this year, the brewers' grains and distiller's grains. A car-load of brewer's grain contains twice the amount of the protein and fat as bran; it may not be quite as digestible.

Cottonseed meal at $30 is not dear when we think it has forty per cent. of protein and ten per cent. of fat. Of course we can't feed that in excessive quantities, but a couple of pounds a day may be fed with profit.

I find I can get as much milk out of a ton of twenty per cent. gluten as I can out of a ton of cottonseed meal, but if I feed the gluten exclusively my cows will get thin. Then the linseed meal, very rich in protein and very economical. Prof. Fuller told us this afternoon that some of the stock feeds on the market sold as high as $160 per ton, and are composed chiefly of linseed meal at $32 per ton, I have never seen the man who denied it, but then, they tell you it is mixed with several expensive drugs. Well, if you want to feed it, I will guarantee this to be as good as the drugs they use: 100 pounds linseed meal, 5 pounds powdered charcoal, 5 pounds Epsom salts, 5 pounds common salt, 4 pounds saltpetre (which they call nitrate of potassium and we don't recognize it), 3 pounds fenugreek.

You can see how very expensive these things are, and I would say that if the animal is well, I would not give her any of them.

Well, friends, there is rational feeding. Now, how much will you feed? Why, we will feed all the animal needs to keep her in good condition and in addition to the coarse feeds she has, just as much grain as she will pay a profit on. That depends a good deal on the cow, a good deal on what you are getting for the milk. If you are getting four cents for it, you can feed better than on three cents. It is not "How much milk can I carry away," but "how much have I left for myself?" That is, over and above cost. I think it can safely be put down that eight pounds of grain in addition to the silage and good hay is as much as the average herd will pay a profit on for a daily ration.

But, you ask me, will that ration balance? I don't care a hill of beans whether it balances or not. I have quit sitting up nights figuring on that.

Now I am going to ask the old cow whether that ration was balanced or not. "How," you will ask? I put my hands on her skin; if that is soft and oily as it is in summer, when she has pasture grass, she is all right, but if it is course and rough, then we put in more protein. Then, her droppings I consider a very important indication. If they are too hard, I would feed her more linseed as a laxative and if they are too soft, some cottonseed meal, and I don't care whether it balances from one to four, or from one to seven, it is all right.

And again, there is a difference in the cows. I find that the Holstein will take a wider ration with more of the heating elements than the Jersey. Again, I find that it depends upon the way the cow is kept. A cow that is kept very cold needs more heating feed. You go out here on the Pennsylvania railroad some day when it is very cold, and you will find that the train is losing time, and the conductor will tell you, if you ask him, that it can't get up steam; the trolley car is making its usual time in the same weather because its power engine is under cover.

We want to calculate by weight and not by quart, and first we must feed that cow so as to keep her in good condition; next, we will feed her for profit and not for production. We will give her the succulent silage, then we will follow with the alfalfa; then we will feed her the coarse feeds we have and to give our animals what they need of protein, we will depend on oats, peas, and home-grown feeds, and when we need to buy, we will buy where we can get the greater amount of protein for the least amount of money, because the cow will be the better for it, and then we will feed her as much as she needs to keep her in good condition and that will be rational feeding.

Nine a. m., Thursday morning, January 24th, 1907. The convention came to order with Mr. Norton in the Chair.

President Norton: The first thing on the program this morning is the Secretary's report.

Secretary Bayard: I have no special report to make. You will find the proceedings of last year on the desk, where you can get them, and see for yourselves what has been done. We have not got our corn awards arranged yet, but we will do better next year, and get more money for it.

President Norton: We will now have the Treasurer's report.

## REPORT OF J. F. LANTZ, TREASURER

**REPORT OF J. F. LANTZ, TREASURER.**

Mr. Chairman and Gentlemen: I am not going to give you a written report this morning, owing to the fact that when I write a report I am very likely to go to too great a length, and as we have a very good program I will make my report very brief. I wish to say that this Association has no salaried officers, and at times the officers have had to reach down into their pockets to meet the necessary expenses. And so, when we wanted a good report printed, and had no money to pay for it, "The National Stockman and Farmer" printed it for us free of charge. The officers have always paid their own postage, in addition to furnishing the stationery and doing the work.

Now, this year we would like to get out a good report, and all those of you who are not members of the Association we shall be glad to list as non-members, if you will help us along by giving us a dollar, and we will send you the report which will be worth more to you than that dollar.

I will now give you the actual report in figures, which is as follows:

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| Balance on hand | $ 64.11 |
| Annual dues received | 115.00 |
| Department of Agriculture | 225.00 |
| Advertisements in "Annual" | 58.00 |
| Received from Dairy Union in payment of their share of expenses of last Annual Joint Meeting | 144.21 |
| Total | $606.32 |

### EXPENDITURES.

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|---|---|
| Bills paid Lecturers at last Annual Meeting | $265.69 |
| Stenographer | 65.00 |
| Printing Annual, Postage Programs and printed matter to members | 42.47 |
| Total | $523.16 |
| Balance on hand | $ 83.16 |

President Norton: Are there any remarks on this report?

Mr. McSparran: Is there a Committee on Resolutions? I think that since "The National Stockman and Farmer" has been doing our work for nothing, we ought to extend them a vote of thanks.

Secretary Bayard: "The National Stockmand and Farmer" has been thanked for it. That was done last year.

President Norton: I will say that I expect to appoint a Committee on Resolutions, also an Auditing Committee a little later, and any one who has any resolutions to offer will please reduce them to writing, when they will be presented to the Committee and brought before the house. We want to proceed with the program now, so I will appoint these committees a little later.

Dr. Hunt: Mr. Chairman, I have an announcement to make to you this morning, that I think you will be glad to hear.

Pennsylvania State College as a farming instution has three objects in view; one is, to obtain knowledge relating to the industry of Agriculture and to make experiment and research; another is to educate young men and women to go out into the world and carry out instruction; and the third, to extend to the citizens of the state, to farmers and others, the knowledge which we may gain at the Experiment Station. When we find out anything that will be of benefit to you, we don't want to keep it under a half-bushel, but we want to get it out among you, where it will do some good. Now, the Board of Trustees for a number of years have been endeavoring to bring about such agencies as will bring the School of Agriculture and the Experiment Station in touch with those who need it, and them in touch with it in a practical way, and for a couple of years they have been endeavoring to get a man—**the** man, and the only man that they thought ought to be in that position. If you did not know him so well I might say something about him, but you know him too well for me to be able to add anything to his qualifications. I could not do that if I were to try, so I will only say that this is the young man that the Board of Trustees has selected for the work, and he is to become Professor of Extension Work. I take pleasure in introducing to you Professor Alva Agee.

Prof. Agee: Mr. Chairman, Ladies and Gentlemen: As yau have already learned, Dr. Hunt is a very taking man.

I am glad to meet the Live Stock Breeders' Association of Pennsylvania. Last week I addressed a meeting of the National Breeders' Association at Columbus, Ohio, and it was a great meeting. There was gathered there a large number of men, like you, practical breeders and men interested in heredity. If there was any criticism at all to be made of last week's work, it was that the program was too full. There were too many good things to digest. And I congratulate you on your program—a program that will be a benefit to all who are here. Over there I was just a little bit uneasy for fear the large mass of facts would cause distress to some of us. I thought of the young married man whose wife woke him in the night, saying she had been listening, and she was sure she heard some one in the pantry at the pies she had made, and he said he didn't care, so long as he didn't die on the premises. I enjoyed that meeting over there very much, and here I have been delighted with some of the best meetings during the last three days that I have ever seen in the State of Pennsylvania. Now, I don't know very much about live stock breeding, but I am willing to take the information you give me and extend it to others. I am like a friend of mine, who, like most of us, believes thoroughly in our President. One day some one asked him whether he believed in infant damnation, and he said "Why—I don't know; what **does** 'Teddy' say on that point?" and so I am in the same boat. Whatever you people say I am willing to spread abroad, and whatever I say or think this morning, does not concern the program at all.

Some of your people have been interested in our Farmers' Institutes, and in our Department of Agriculture, believing they were effectual in reaching the people with the facts that have been developed by research and work at our Experiment Station, and above all, have been interested in the education of our young men. We have talked college education with our neighbors; some of us have said "these boys must go to our Agricultural College and take a four years' course in Agriculture before they are fitted to become land owners." Now, we are all practical people here this morning, and to us that sounds good, but it is a fact that ninety-five out of every hundred who will own land in Pennsylvania, and Ohio, and New York, and in our great agricultural states in the next quarter of a century will not be men who are able to spend four years in an Agricultural College. Some of these boys of ours are not students. I mean by that that they are not book men, they are not boys who are willing to spend four long years in the class room; they prefer to work on the land. That means this, then: these boys who will be the land owners in the next quarter of a century will not know how to farm intelligently unless we can reach them in some way; they will not know any law that governs any plant or animal. Well, some of us have said that the solution to that problem lies in teaching agriculture in our public schools. Now, I am heartily in accord with that. I agree with Director Bailey of Cornell in what he says about teaching geography; most any man does agree with what he says about teaching the kind of geography to a class of boys that concerns them most—and that is the geography of the farm. You take the average boy and ask him "How many fields are there on your father's farm?" He will say "it is 10x12—I don't know; I'll ask father." Father don't know, and he comes in the next day with a new idea. Then we ask him "What is the distance from your residence to the farthest field on your farm?" and then he would measure it, and find out how much time was lost in tilling that field. Then we ask him about the soil, and the plants, and the animals, and I tell you, we are practical men, and within the next quarter of a century we will not need in that neighborhood a college to teach our boys properly in agriculture. But what are we going to do now? How solve the problem before us?

Last Monday and Tuesday of this week, I spent a four-hour school day at the Ohio State University, with 136 of our Ohio boys who go up to that institution to take a ten weeks' course in winter instruction. We take some of these young men who are absolutely ignorant of any law that governs plant or animal life, and we put them in with some of the boys in the four-year college course, and we give them instructions on plants and animals and soils, and teach them to judge specimens of live stock, and we bring them into contact with the practical elements in agriculture. They do not learn much in these ten weeks, but they will be largely benefited. They will see that Agriculture has a wider outlook than most men make it. That has been done in Ohio. We are going to do it at Pennsylvania State College. It is already being done in Iowa, Illinois and Minnesota.

If you will permit me to be personal, I will say that up to a few weeks ago, I thought it would be utterly impossible to convince me that I had other work to do than the work I have been doing, and that interested me. When other matters were presented to me at one time in Ohio the past few years, I said "No, sir; I am perfectly satisfied; I don't want anything better than I have here," but when I realized the possibilities in Pennsylvania of bringing your boys to our State College, where there is a fine corps of scientists at work—when I realized the possibility of bringing these boys who are going to make their living in a few years to our State College for ten weeks, and starting them right, I was very easily tempted. I know it is no easy work; I know it is difficult work, even with the co-operation of men who believe like me, in a better agriculture. It would be even more difficult if I did not believe that men like you are working with us and upholding us—working in harmony with Dr. Hunt and the Trustees of the College—with all of them. But we are going into the work, knowing we have an ally that will strengthen us where we are weak, and that these boys will come to State College within the next few years for the benefit of agriculture, and of your grand Commonwealth.

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## PENNSYLVANIA STOCKMEN AND THE MEAT INSPECTION LAW

### By Dr. Thomas F. Hunt, Penna. State College

Mr. Chairman, Ladies and Gentlemen: Eight years ago I stood one Sunday on the Great Salt Air Bathing Pavilion at Salt Lake City, and looked over that broad stretch of country, and I thought of Dickens' remark that that he did not know anything deader than a door nail except a coffin nail. He could not have stood where I did, and looked over that vast stretch of country without a sign of living vegetation, and standing there, looking over that broad stretch of dead country, you can judge my surprise when I found later that that broad area of dead land of which I am speaking was once laid out in fertile farms that were the pride of the early settlers of Salt Lake City. But the vegetation failed through lack of irrigation in that land of the alkali, wherein no living thing can flourish without it, and the farmer moved off. Now, that is a particularly striking illustration, and I use it to show you the foes that have surrounded the alkali sections of the United States.

Then, I took the train for San Francisco, and if you read the glowing account of the railroad circulars, you will expect to find yourself at once in the beautiful valley of the Sierra Nevada; they give you a fine description of it, but they fail to say anything about the two nights and days you must spend in traveling through the alkali desert where the alkali dust almost chokes you, and there is no sign of any living thing.

Well, the next morning I got up, and I asked "What state is this?" and they said "It is Utah;" I said "Why, I thought I was in California by this time," and they said "No, this is Utah yet." Then I asked them "Is not this the trail of the Forty-niner?" They told me it was, and looking over that vast expanse of desert, where there is no living thing. I said "but how could he get through here alive?" He had horses, for there were no trains, and he could not travel on foot all that distance, and supplies must be taken along; and probably he had his family with him. How could he ever get across this desert? There is nothing to support animal life, and no living plant or tree. Well, the rest of the passengers were tenderfoots like myself, and no one could answer that question. The conductor could not enlighten me, but finally a man who said he was an engineer, and had engineered all through that country said, "I can explain that to you." He said "when the Forty-niner went over there the grass was knee deep. These were the sheep pastures of Nevada, right along here, where we are now running." (Mr. Wing was there and can tell you whether or not I am right; this is the engineer's history, and I don't know whether I am right). He said, in the first place came the cattle man, and got possession of the land when the grass was knee high, selecting the places where there was grass there and water there was all the title required so far as he was concerned, and the next cattle man who came along took the same thing. Now, he had the cattle, but he did not figure on the sheepman. Then he came along and I have been told by men out there that the sheep can go thirty days without water, and I do know that the sheep can get ahead of the cattle on the water proposition. And no cattle will follow sheep in large numbers. Then, he said, it rains some times out here, and you people who have not lived here know nothing about this adobe mud; it is worse than anything you ever saw. The sheep you know, not only eats the grass like cattle, but he will burrow down and pull out the roots, and they pulled out the roots of the grass and trod down this adobe mud so hard that where there was grass knee high in the days of the Forty-niner, there is now neither grass, nettle, nor jack rabbits. So

I began to notice more particularly. I had supposed that this country, this one-third of the United States west of Denver, was a be the feeding place of the whole United States, that we were to go there and get our young cattle and bring them east. That was what I supposed eight years ago, but when I looked at it, it looked different. I can bring it home to you. Let me give you a few illustrations to call it to your attention.

What is contained in the state of Nevada? I went up to Carson Lake and took the stage down to Carson City. Along the stage line I saw a "V" shaped box, and in that box was running water. I kept looking at it and wondering what it was. Finally I summoned up courage enough to ask the only other passenger on board, who was a woman, what it was. "Why," she said, "this is a flume." I said "What is a flume?" "Why," she said, "that flume brought down wood from the mountains to the box factory at Carson City." "Oh," I said, "there is a box factory at Carson City?" "No," she said, "there is none there now." I said "Why not?" I suppose she thought by that time I was a fool, but she said "We have no wood." I was afraid to ask her any more, so I kept on looking and at Reno, Nevada, I asked a man why it was that there was no lumber in that part of the state, and he told me that Mackay, the lumber king, had over two hundred and fifty men at work up there day after day for more than four years cutting that wood. I went up to Reno by train. The train stopped; I have never learned why it stopped, because I didn't see any house. So I said "What is this place?" They said it used to be a mining town of two thousand inhabitants, but it is all gone now. There is no wood, no tree, no vegetation there, and so they have gone. Now you can see why it is that Nevada, several times the size of the state of Pennsylvania has a population about the size of this city of Harrisburg, and it was less in population in 1900 than it was in 1890. I am not saying this to disparage any one, but I only want to bring home to you this proposition. As a matter of fact, that trip made an easterner of me, and set my feet in the opposite direction, when I came to look at the surrounding country. I had gone West with the intention of staying there, but I came back East, after I had gone over that country determined to stay East.

A little over a century ago men began to go over the Alleghany mountains into the new country beyond. Then, from 1800 to 1850, they spread into Ohio and Kentucky, and perhaps Illinois, and they flourished at your expense. Why? For two reasons; one was that it was a new country, fresh and undeveloped, and your young blood went out to develop it. Then came the Civil war, and after that was over the stream crossed the Mississippi. Heretofore the people of the United States had dug out their homes from the forest; then they came out with plows, and turned a furrow or two and made a home; then came the self-binder, and then other improved farm machinery, making it easy to make a home, and from 1870 to 1900 the population of the United States doubled, and in these thirty years the agricultural industry developed.

What does that mean? Why, it means that in thirty years these people of the United States were compelled to produce as much as they had done in 250 years before. For one hundred years these people out there have been competing with you because they have had cheap lands with fresh soil, and because they had your fresh young blood to develop it, and they raised cattle out there at practically no cost whatever. Take the illustration I have frequently used of the Jew peddler who went to Deadwood thirty years ago, and distributed a few cattle on the public land there. A few years later he had 20,000 and then 300,000 of cattle worth $3,000,000, every dollar of which he made by distributing cattle on government lands. It was easy for these people to ship cattle into this new country, take them off the train and distribute them on that land, and then ship them back at $2 a head, you, of course, to stand the loss. I spoke to a Westerner about raising cattle in the East, and he laughed at me, and said "You go back and teach those Eastern farmers to make Jersey cream."

Now here, gentlemen, is this proposition; this Eastern country is adapted to the raising of trees and grass; the Western country is adapted to the raising of corn cheaper and cereals. Then we have between the great central West, between Pittsburgh and Denver. And when proper economic conditions are developed regarding the raising of grass and trees, and the cutting down of the trees is stopped, the tree and grass men in the North Atlantic states must flourish. Pennsylvania and New York will make great horticultural states, because they have the trees, and the time is coming very rapidly, I believe, when this will be the cattle producing country, and the West be better adapted to doing some other thing—not that it is not a good country; I would not say anything against that part of the country—but it is better adapted to doing other things, and we need not send our young blood out there to develop it. It has got to be developed at its own expense. You have been doing that for a hundred years. You could not help it. No one could. For the last hundred years they have raised stock so cheaply that you could not compete with them. Some of you have not had stock enough to keep up the fertility of your land, but just as soon as you have more stock on your land you will raise more corn and more wheat, and you can afford to keep more stock because you are going to be paid better than you have been. Some of the people here have thought that the only thing that is going to continue in live stock is raising milk and butter and shipping it to city markets; that the meat business is out of it. Now, the fact is that these Eastern states are better adapted for raising meat stock than they are for dairy stock. They are better adapted to raising grass than cereals. In Nebraska there are 32,000 hand separators; out there where you have been thinking of them only as raising steers they are milking cows, and sending their milk in some instances five hundred miles to be made into butter. Three creameries in the state make ninety per cent. of the butter made in that state. You have competition in dairying, and there is coming about a re-adjustment of the live stock conditions of this country.

Now, there is one other thing I want to call your attention to; some one has referred to what "Teddy" thinks, and this brings home to me that they have been quite busy in Washington lately. They have passed two very important laws. In my mind they are more important than most people realize. They have passed the National Pure Food Law, and they have passed the Meat Inspection Law. It is going to make a difference, I think. I went into one of the big packing houses in Chicago, and when the head man of the house showed me about, he took me to the department where they make bone handles for knives. The girl in charge showed me how they were made, and "These we make into bone handles," she said, "and" showing me some other, "those made in this way are the imitation stag horn, and those." showing me a third lot, "are real stag horn." The girl was perfectly honest in her endeavor to make things plain to me. Now, the other day I bought this knife of a perfectly honest young man as genuine stag horn. Now, it does not make any difference to me whether I carry a knife with a handle of genuine stag horn or not, but it does make a difference when I eat a piece of meat whether it has poison in it or not. It makes a difference to me when I eat sausage whether I eat so many pounds of sausage, or so many pounds of sausage mixed with so many pounds of potatoes, and so many pounds of water. I was told in this same packing house that there was no kind of sausage in the world that they could not supply, and I have a letter in which the enumerated sixteen kinds which they make, and many other kinds which they do not care to mention, for fear of hurting the trade. Here is the point: this is the Pennsylvania farmer's opportunity to put on the market a good article.

Now, gentlemen, you cannot buy Evaporated Cream any longer; it will be just plain Evaporated Milk. You cannot buy colored peas; if you put colored matter on the market some one will find it out, and you will be out of business. But, you say, if we put a good article on the market some one will put it out of the market. That has been the case for the last fifty years, but I believe that from now on is going to be the opportunity to raise the finer articles—a greater opportunity than ever before. I believe there is going to be a discriminating public, who will be willing to pay a good price for it if they are sure of getting the genuine article. I believe that instead of a few large packing houses—I have nothing to say against them, for they are all right in their places—but I believe that instead of a few large packing houses, there will be scattered throughout Pennsylvania small abattoirs, perhaps co-partnership abattoirs, the same as co-partnership creameries, and they will say you "Can get genuine sausage there, and can get it fresh every day and inspected" just the same as the creameries. There will be some disadvantages, but there will also be some advantages, and the bones and fertilizers instead of being shipped from Chicago will be right here, and I believe from now on is the day of the Pennsylvania farmer; you will produce more and more of the meat products; there will be less and less competition from the West, and instead of being confined to a local market there is going to be a demand for your products, and you are going to lead in producing a good article. I am not interested in cattle; you know I am looked upon as an Agronomist; I am interested in raising crops, but there is an old Flemish proverb that says "No grass, no cattle; no cattle, no manure; no manure, no crops," and this I think you will find holds true, and since they are all interwoven, I hope the Pennsylvania farmer will take hold of his opportunity, and turn his attention to the raising of cattle for the market that is sure to come for him—is coming now.

President Norton: This paper is now open for discussion.

Mr. Wing: Mr. Chairman, it does not seem to me that we should allow that splendid address to go without a little discussion, especially as it is the most vital one that has been touched upon at this meeting. The question is, Are you up against it? The time has come for the farmers in Pennsylvania and Ohio to wake up to their opportunities. For some years farming had rather fallen into disrepute in our eastern states; there was too little in it. In Ohio I have seen corn sell at 16 cents per bushel—a case of 16 to 1. But there is a better day at hand. These conditions in the West of which Prof. Hunt speaks—the disappearance of the grass out there—are all true, and more true than he has told you.

I spent a month in Colorado recently, and looked over conditions there. They saw something must be done there, and they are learning how to do things there, and how to do them well. They work harder than lower, and I saw the farm fences going down, you do here, but they have the faith to overcome the necessary obstacles, and will find a way. They have sent the price of land up in the San Luis Valley to $175 to $200 an acre; it is worth that now at Fort Collins. They have faith, these people. I said to them "But look at the distance from the market." They said "That is easily overcome with transportation facilities." And they said "We can raise four or five tons of alfalfa to the acre and get three crops." I said "I can do that in Ohio. What do you get for it?" They said $5; I said "I get $12 in Ohio." They said, "We can raise 75 bushels of wheat to the acre and some men get a hundred." We said "We can't do that but we can grow corn, and get an average of 80 bushels to the acre." And they take this to market long ways in teams, but they have faith in their future, and courage to work hard for less money than we people get here. Now, do you see why they succeed there?

Several years ago it was my privilege to go across the water. I guess I was always a pessimist. I remember when I was a boy —I was born in Ohio—and I can remember when a farmer got 11 cents for his hogs, which he had fed on his farm, and sold his steers at $90 to $120 a head, and once when I was a little boy, I was sent with some of them to a neighboring farmer, and when I got them there, the old man gave me a dollar. I tell you I was proud. When wheat got down to $1.25 the farmers said, "Times are getting poor now." They kept on growing poorer and poorer, and the farmer began to average only 20 bushels to the acre and then fourteen. Then I bought a field next to ours that I had been wanting for a long time; it had got down to where I could handle it. I have that field now. But the average yield grew smaller, prices lower, and the paint wearing off the houses, and the mortgage on the farm grew greater rather than smaller, and I remember riding along in the train and seeing the old houses growing shabbier, and the old farmers getting white-headed, and I said to myself "Agriculture is doomed here; the richer west is getting richer, and the poor farmers here are getting poorer, and there is nothing left for them at all." Soon, however, times began to pick up in Ohio, and they began to pick up here, and today times are much better than they were then. But still it seemed to me that the soil was impoverished, and then I began to think of it, and it struck me that this was new soil; it could not be worn out; it had been in use less than five hundred years—much less in most places—while in Europe the farmers have been farming the same soil for centuries, and are still farming it, and just about then I had the opportunity to go over to the old world, and I started in England, and then went down to the Isle of Jersey, and then over into France, and the one thing I wanted to see was how they could have lived on the land so long, and could still continue to live on it, and it was the most marvelous thing I ever saw. In France I saw the finest farms I have ever seen; the next were in Scotland, and I don't know whether Scotland was not better, even on the whole than France. But in France, where I stopped, there was an old Frenchman, who offered to take me some miles out of Paris to see a fine farm which he knew, having come from that neighborhood. So one beautiful morning we started out by train. Now, the old Frenchman could not talk any English, and I knew about three words of French, but we talked all the way. When we saw anything that did not please us, we frowned, and shook our heads, and when something particularly attractive came under our notice we smiled, and shrugged our shoulders, and we understood each other. When we got there, we went directly out into the fields, and I can assure you I have never seen a finer sight than that field presented that morning. There was the wheat as high as the backs of his oxen; one man went alongside three yoke of oxen, one man driving, and an American binder doing the work. A little beyond this was another field, and I don't think I have ever seen quite so many clovers mixed together—the Crimson Clover, and the Red Clover, and the Alsike Clover, and then the Alfalfa—some fields were alfalfa entirely. Here were men mowing with old-fashioned scythes with a short straight blade, very unlike those used in America in former days. I asked the man to let me try it, but found I could do nothing with it, although I have mowed many an hour with the long curved scythe that was used in this country. Then behind the mowers came the women, and they raked the grass together in little bunches, and tied the bunches and set them up in little shocks. Wonderful grass it was; I have never seen anything like it in my life, and the green fields and the fragrant clover; it covered maybe twenty or thirty acres and it was of marvelous growth.

The farm hands lived in little stone houses which they owned; many of them had lived on this farm all their life and their fathers before them. They did not own the land; that belonged to the farmer, but they owned their houses and did the work by the job. This was an unusually large farm, about thirty thousand acres; it had an immense barn, and I saw where the cows were pastured, and I saw where the 2,000 sheep were kept.

Up you drove through a big, wide gateway to the castle, erected centuries ago, passing the big stable where they had those wonderful cows that made the milk and cream for the Paris markets to the north end of it, which was the residence part, the residence of the man who owned the castle and the farm. He was worth probably $13,000,000. He asked me into the house and there I found a lady that spoke English, and I spent the afternoon in going through that magnificent old castle with its fine art galleries, and elegant libraries, its collections of armor a thousand years old, in the grand old halls with the windows down to the floor; but there was one peculiarity about those windows; every window on every side of the castle looked out on the same thing and what do you think that was? They could see the cows go out to pasture in the morning in those marvellous fields, and they could see the sheep at play in the fields beyond, but from every window they could also see a great pile of manure—the greatest pile I have ever seen; two piles, each one as big as this room, sprinkled over with some composition to deodorize it. Not a very aesthetic object, but one worth a million dollars to that old Frenchman, and I am sure that every time he looked at it he said, "How proud I am of this pile of manure; it feeds my family; it feeds my laborers, and my cattle by feeding the land; it is one of my greatest treasures."

I finally got away from these people and went out into the fields again, and pressed my foot into the soil, and it ground out rich and brittle; and I said to myself "Here is land that was old a thousand years ago, and is still more fertile than anything you have ever seen, while out in Ohio you think that new soil is worn out." And I said to myself, "Joe Wing, learn a lesson from that old Frenchman's manure pile, and go home and put it into practice on your land, and some day your land will be so much more fertile that there will be no comparison between the two."

President Norton: Any further discussion?

Dr. Pearson: It has been a great privilege to listen to these addresses of Prof. Hunt and Mr. Wing. I have for years maintained that the farmers of Pennsylvania have been oppressed by an unjustifiable spirit of depression. It is not justifiable. I used to think, like Prof. Hunt, that the West was the great cattle breeding district, and that it would for a long time to come be our source of supply, but I was impressed during a recent trip to Montana, which is one of the great cattle raising states, as to what the condition really is of the cattle breeding industry. In Minnesota which has three times the acreage of Pennsylvania they can not breed cattle and horses enough for their use. They are buying horses in Chicago and taking them West.

The good land has all been taken up in the West; there is no more good land; there is no more pasture; and the great cattle industry of the West has passed to the farmers of the East. In talking with some stockmen in Montana, I spoke of the small development of the live stock industry in that state. They said "Wait until you get to the Big Hole country; you will see there the finest horses and the best cattle you ever saw." So I waited until I got to the Big Hole Valley, and what did I find there? About 20,000 good steers, and 40,000 were distributed from the stockyards at Lancaster last year to feed on the pasture, of Lancaster county, and we don't boast of it and most people don't know of it.

In the matter of beef I think there is something we have overlooked. I think Mr. Wing will agree with me that if the Pennsylvania and Ohio farmers would raise Shorthorns they would find them a profitable investment. It costs the Western ranchman from $10 to $12 to produce a calf, and if our Eastern farmers were to grow Shorthorns they can usually market them in a year. If they are extra good they are retained over another year, but where the herds are retained there is very little attention paid to the calf, and the bull is sold to the morgue. And if our dairymen would grow Shorthorns,

or Herefords, and keep the beef bulls they would raise a beef quality better than that of the West. These calves are sold at $2.50. In other words, the Eastern farmer can buy for $2.50 what it costs the Western ranchman $8 or $10, or $12 to produce. Of course, there is the calf to raise, but in some districts the skimmilk comes back, and on this the calf can be raised, and I believe that we can compete successfully with the beef interest of the West if we will but keep this in view.

Then we have another interest in this state which is not always considered, and that is we are constantly purchasing and bringing to our farms the surplus fertility of the West. As Prof. Hopkins explained most of the crops that are being harvested in the West contain a large proportion of nitrogen and phosphorus, and we are buying them and getting the benefit of it, and when we raise beef we do so very often without any regard to the manure as a return.

Prof. Hunt spoke in a very interesting manner of the future of Pennsylvania as affected by the new meat inspection law. I want to call your attention to a defect in this law making an appropriation of $3,000,000 per year for the inspection of meat for export or interstate use. The appropriation gives Pennsylvania a proportion of over $250,000. Now, I was told by a stock breeder recently that the inspection of the large packing houses is becoming more and more stringent. He told me that Armour's men had orders to condemn any steer was not absolutely perfect. What difference does that make? Just this: before the meat inspection law they could ship this meat anywhere, but now they dare not use it for interstate or export purposes. So they ship the steers that will not do for export trade to a firm that is doing business entirely within the state in which it is located, and cannot, therefore, be put under federal control, because it does no export or interstate business. There are a great many packing houses in Pennsylvania; under federal inspection the buyer for a firm doing export or interstate business would not take any consignment that does not fully pass requirements, but the man who does business within the state alone can do it, and does do it. So this law is not all that it is intended to be and the appropriation of $250,000 does not touch the small fellow, and he will continue to do business in his own way unless this law of the United States government is supplemented by state meat inspection laws. The people of the United States want inspected meats, or they do not want them. If they do not want them there is no reason why the Federal government should spend $3,000,000 a year for inspecting their meat. If they do want them it is necessary to take action in the several states, and then use the appropriations for enforcing these laws.

Mr. Wing then spoke as follows:

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## "THE GOLDEN HOOF"

### By Joseph E. Wing, Mechanicsburg, O.

Mr. Chairman, Ladies and Gentlemen: I am glad to have an opportunity to talk to you about the sheep. It is a good subject, and we will see what we can make out of it in the time before us. Some times I write my speeches and read them, but it was very discouraging to see people grow tired before I got through, so I have given it up, and when I see that they become tired of the subject, I stop talking.

I am going to outline for you the kind of husbandry that will pay the small farmer in Pennsylvania. The kind of sheep ranching that is done in the West will not do here. There the man who has only 10,000 ewes does not count for much in the business.

Now, the man with 10,000 ewes cannot lamb until the grass grows. That will not be before May or June, and there will be more lambs born in June than in May. Of course, he has a little anxious time while the lambs are coming, but there will be a man with every thousand sheep, and besides seeing that they do not suffer from the temperature at night, and that they are protected from wet weather, they do not want to be disturbed very much during this time. After the lambs are born it is a little easier time then, but the men have the extra herd on their hands until the earliest lambs are old enough to go to market. They have to see that they do not get into the alfalfa fields, or the corn fields, and these little fellows slip through very easily. Once they get in it is very easy to see where a sheep has stood. The eastern market for the western farmer begins in August or September, but the heaviest market comes in October, November and December. We used to buy tiny little bits of fellows and take them home and feed them on alfalfa and raise them, but it is getting harder and harder to get them. I remember not so many years ago buying very nice ones at $2.75 per hundred pounds, live weight; this year I paid $6.35, and I had 1,400 of them. It took some faith, and I almost thought "I can't do it."

Now, the men of Pennsylvania have more sense than to try to compete with the western ranchmen. They can't do it very well. You have your grain here on your land, and you run the danger of stomach worms. You may get in in time if you have alfalfa, but the corn growers can't do it. So the thing for the Eastern farmer to do is to raise his lambs earlier, and get into the market before the western lambs are ready to be marketed. Then he will have no competition from the West, and can get a good market and good prices.

Now, I think it will pay the Pennsylvania farmer to have one hundred ewes. That is a nice little lot to take care of. He need not learn to know them all by name, but he can know them all by sight.

I am not talking to you about the winter lamb business now; I am going to talk to you how the ordinary farmer can manage to make money on sheep in Pennsylvania.

He should begin in February or March, and first I want to talk to you a little about taking care of the ewes in pregnancy. That is the thing most people know little about. I love to talk about it, because I have had so much experience with it. I had the benefit of that when I was a young man and had a young wife, and a nice lot of sheep, and I was as happy as I could be. I kept my sheep very carefully housed, and protected from the weather, and led them out to water, and took all the care of them that I knew how. I had read a great deal about the value of protein in the feed and bone meal, and of wheat bran and clover hay, and oats sometimes, and I never saw anything prettier than that bunch of sheep. But when the lambs came then the clouds came over my sun. Feeding so much protein had developed too much bone, and the lambs could hardly be born at all. I remember one weighing seventeen pounds, but the mother died and the lamb died. I took it into the house and nursed it and fed it, but it died. That lamb died because I did not know how to feed. Well, an old man who had raised sheep for many years said to me "You take too good care of your sheep; let them hustle, and give them oat straw. You have wasted your feed by giving them too much." So I gave them oat straw and a little corn fodder, and they looked fine and well rounded out, but there was something not quite right. You can learn to tell that in your sheep just as a man learns to know when his wife is mad. At first he needs a diagram to show him, but after a while he learns it instinctively. Well, the lambs came, and they looked all right; there was nothing wrong to be seen, but they did not live. That ewe did not have that lamb at the physiological moment; there are forces at work in her beyond the care of man, and I learned then this wonderful thing, that if the ewe did not have milk in her udder, she did not love her lamb either. I have had an old ewe look at me, and then at the lamb, and say as plainly as if she could talk, "Joe, here is that lamb; I have no use for it; you had better take care of it." And I have tried it many times, and have nursed those lambs and fed them, and done my best to raise them, but rarely with success. And I learned this then, that if a ewe does not have milk in her udder, she does not have any love in her heart, either, and these ewes did not have milk in their udders because they did not have these lambs at the physiological moment.

Then I thought if I was careful to get a good sire, my lambs would be all right; so I exercised great care to get good sires. Then, one day I had a lamb born, and the moment it was born it looked around very lively, and found its dinner, and enjoyed it, and I said "That lamb has strength, and it is going to live," but it died. Its father lived, and its mother lived, and all its kindred. It would take a special story to tell how too much strength is not good—how it is almost as bad as too little.

Now, we have learned how the lambs should be born, and we will go back to our ewe. We keep that ewe carefully housed, and protected from the wet weather, and we feed her up with alfalfa and bran, and yet not one of those lambs will live. Why? She gets no exercise; she stands too much, and not one of those lambs will live. Keep her out doors, and give her exercise and feed her well, but not too well, and see if those lambs will not live. Our sheep must not be exposed to the weather, but they must not be kept too warm. You can't raise sheep in this way. I have a neighbor who has a barn worth $3,000, and he has never raised a single sheep in it. He keeps it closed too tight, and his sheep get no air. You need the air.

Now, a man who has sheep should have a lot of little panels made, about 3½ feet long, and fitted with two little doors to keep the lambs together. You can fold these panels up and put them away when you don't want them.

When the first sheep are born, I tell you it is a busy time for the shepherd. The ewe may have twins—she probably will—and all the better. Take her into the barn, and put her into this little panel pen, so that she will have room to move about with the lambs, and then you can take care of her. It is very nice to turn her over, and start milking her, so that the lambs can get their first milk, but we have not time to talk about that. You put her into this pen with her lambs, so that they will not be able to get out, and run around among the others. Never allow them to get out among the sheep that have not yet born their lambs.

Never give the ewe any change in her feed, and no increase. It may cause a great many troubles, and give her indigestion to give her anything different, but gradually decrease it while seeing that she still has enough to eat. It is a common mistake to give her some protein, and some wheat bran, and some alfalfa, thinking that will make milk.

Now, if you think the lambs cannot suck all the milk out so as to get a fresh supply next time; it is wise to milk her for a few days until the lambs get bigger.

Now, another thing; I am pretty near getting to the winter lamb business, but I want to start you right for the spring, and then we will start on that in the same way. Make a place where the lambs can go in and the ewes can't follow, and make it so that they can get in easier than out. The lamb is the creature of opportunity. Most men are like them, and some of you men here will probably go to the legislature some day, and some will probably go to the prison; it all depends upon opportunity. So, if the lamb has the opportunity to go into this place he will do so. Place in that pen a little trough, and in that trough some grain—wheat bran will do, or a little corn meal, very coarse ground, or about ten per cent. oil meal or buckwheat bran. It doesn't take long for these little fellows to get started eating the grain, and I tell you they enjoy it. Then comes the grass in the fields, and here is something I want to impress upon you; keep them off the grass when it is first growing. When you turn them out of the pen, turn them into a little yard, and keep it bright and clean, and when you give them grass, feed it to them on the ground. Why? There is nothing in the grass beyond a little coloring matter, but until he gets something to do, he does not need very much of it. When I was ranching in the West, our only anxious time was in the spring when the time came for the lambs to be turned out. We had 100,000 acres of land, most of it in clover. Now, as soon as a sheep got into it, you could tell where he stood.

Now, when you turn them out you may have some trouble about intestinal parasites. That time comes along about the middle of June. Then the ewes go out to grass with the lambs, and I tell you it is a pretty sight to see those lambs run up and down the fields, and play, and then run up to the ewe, and off again, as if asking her to watch them at play.

Make a place in the field and spread a little corn meal there for them, and one of the best things you can give them is coarse salt that you buy, and then, of course, there is the mother's milk—the best of all for them.

The winter lamb business is conducted in the same way. Begin early, and when the lambs weigh eighty pounds they may be sold. I would not keep them any longer, because then the western market comes in,

and the prices go down. I would try to have them ready for market in June and July. How are you going to do that? It is easy if you have the alfalfa to raise them on. Then with the returns from the lambs, and the old sheep left to fertilize the land, our returns will come in.

President Norton: Are there any questions? We can take a little time for discussion.

Mr. Young: How old do you let them get before you finish the ewes up?

Mr. Wing: My experience has been that so long as the ewe has her teeth she is faithful. In England it is not the practice to do that. They want them all to be four, five, or six years old. I have one ewe that is fifteen years old, and she is all right, and fat, but I don't think she would vote for "Teddy."

A Member: That man with the barn, did he have the same experience in keeping cattle?

Mr. Wing: Yes, I think so. I designed a barn for a man in Columbus. It was the finest barn I have ever seen. It was 160 feet long, and had 16 windows that opened on the inside. I went in there the other day, and he had every window closed absolutely tight, and was trying to raise some Shorthorn cattle. He said "Come over here and look at these cattle." I said "I haven't time," and went around and opened the windows. I have no doubt, though, that as soon as I was gone, his men closed them again.

A Member: What temperature would you have?

Mr. Wing: That would depend on the weather.

A Member: What area?

Mr. Wing: No larger area than necessary to get the air in.

A Member: Would you have windows on one side or both?

Mr. Wing: Adjoining sides, where the wind does not blow, will be all right. Of course, for the man who is trying to reach the early New York or Philadelphia markets a very warm place will do no harm.

A Member: Which is the best profit, winter or spring lambs?

Mr. Wing: It depends very much upon the lamb, and the man who has the care of it, but I think there is more money to be made on winter lambs.

President Norton: I will now appoint the following committees: Committee on Resolutions: J. H. Reichert of Scranton, M. P. Shoemaker of Greensburg, H. W. Comfort of Falsington, Rev. J. D. Detrich of West Chester, Henry Palmer of Avondale and Austin Leonard of Troy. Committee on Auditing: A. M. Cornell and S. F. Barber.

The afternoon session will be a joint session of the Dairy Union and the Live Stock Breeders' Association.

The meeting now stands adjourned until 1.30 this afternoon.

## THURSDAY, JANUARY 24, 1.30 P. M.

The meeting came to order with Mr. Norton in the chair.

President Norton: The first thing on the program will be an address by Prof. Van Norman, President of the Dairy Union.

Prof. Van Norman spoke as follows:

Prof. Van Norman: We will now be addressed by Dr. Dexter of Washington. He represents Prof. Webster, who is unable to be here. The talk on alfalfa will come later.

Dr. Dexter then addressed the meeting as follows:

President Norton: Are there any questions?

Mr. Mitchell: I would like to ask the speaker a question—how to increase the production and fertility of the soil by dairying. That is a most important question to most of our members.

Dr. Dexter: I have an idea that your own president could discuss that better than I can. It is by no means an easy question to answer.

In shipping away grain crops from the farm, you are shipping away a large part of the fertility of the soil. This is especially true of such crops as wheat; but in shipping away butter and milk you are shipping away only the minutest portions of that fertility. A ton of butter which is worth $500 takes away from your farm less than $100 worth of this fertility. You raise forage crops which are consumed by your dairy cattle, and when you sell their product you have a comparatively small article, which can be shipped at a small cost of transportation, and for which you obtain a high price, and which takes away only a minute portion of the fertility of the soil, and a large part of what you feed the cattle is returned to the soil in the shape of manure, and is worth about $10 per cow to the farm each year, and with careful handling produces about $30 in return.

Prof. Van Norman: A hundred dollars' worth of dairy product takes away about $1 worth of fertility, while $100 worth of grain product takes away from the farm $10 or $12.

President Norton: Anything futher? If not, I wish to announce that the Resolution Committee, and members of the Board of Directors, the committee to draw up a resolution on Dr. Pearson, and the Nominating Committee will meet this evening, and report tomorrow morning at the Breeders' Association meeting.

The Auditing Committee will audit the report of the Treasurer, and report to us tomorrow morning.

The next number on the program is an address by ex-Governor Hoard of Wisconsin. He is unable to be with us, and has so written us. The Secretary will please read his letter.

Prof. Van Norman: I have his letter here; it is as follows:

Prof. H. E. Van Norman,
Dairy Convention,
Harrisburg, Pa.

My Dear Van Norman:

I was obliged to wire you today that a severe bronchial attack prevented my attending your Convention. I can hardly express to you my disappointment for I have always taken great pride in carrying out my engagements of this character, but I dare not venture upon such a task in my present condition.

Will you kindly convey to the members of the Convention my sincere regards and best wishes for the success of the cause of dairying in the grand old state of Pennsylvania? I shall be ever ready to the full extent of my powers to further such objects by any means within my reach. I think the day is breaking for the old Keystone State.

My son has wired you that he will send copies of Hoard's Dairyman for distribution at your Convention.

Again regretting my inability to fill this engagement, I remain,

Yours sincerely,
(Signed) W. D. HOARD.

Prof. Van Norman: Personally I have a very high regard for Governor Hoard, outside of his work as a dairyman, and I wish our Secretary might be permitted to send him our greetings.

On motion, duly seconded, this was agreed to.

Mr. Bayard: I would like to announce that the prize corn will be auctioned off tonight, so come prepared to bid for it.

Prof. Van Norman: We will now be addressed by Dr. Pearson on "The Relation of Veterinary Education to Animal Husbandry," after which we will have the alfalfa talk by Mr. Wing, who needs no introduction to men like you.

Dr. Pearson's paper is as follows:

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# THE RELATION OF VETERINARY EDUCATION TO ANIMAL HUSBANDRY

### By Leonard Pearson

The fertility of the soil, and an advancing profitable agriculture, cannot be maintained without animals. Animal husbandry is essential to agricultural progress.

The animal husbandry of Pennsylvania is one of the leading industries of the state, and is the chief reliance of a large proportion of the farmers that work the quarter of a million farms within our borders. The farmer depends upon animals to till his fields, to take his products to market and his family to church, to supply his most nutritious food and a large proportion of his income.

What value would there be in a $55,000,000 hay crop, (these figures relate to the crop of Pennsylvania for 1905) as under present conditions, if it were not for animals to eat it? What would be done with straw from 1,600,000 acres of wheat, and with a $15,000,000 oat crop were it not for animals? About 1,500,000 acres is devoted each year to the production of corn, worth about $30,000,000, most of which is fed to animals on the farms where it is grown.

The rough, bulky, unmarketable products of the farm are concentrated by animals and converted into such commodities as pork, beef, mutton, wool, poultry, eggs, milk and horses for which there is a ready market. Just as the weaver uses the loom to transform his raw material into carpets, cloth and lace, so the farmer uses animals to manufacture grass and other crude products of his fields into refined and higher priced articles.

The profits of farming depend to a very large extent upon the efficiency of the farmer's machines, both mechanical and animals. If the animals do good work, that is, if they return a good yield in the form of growth, eggs, milk, wool or labor for the food they consume, they are profitable; if they do not return a fair yield of these products, they are unprofitable. The efficiency, and that means the profit of the animal machine, depends upon its adaptation to its condition of life, and upon its adaptation to its conditions of life and upon its health. The adaptation of domestic animals to special uses results from the work of the animal breeder. Breeders have achieved some marvelous triumphs in the way of increasing efficiency and in producing and fixing form, type and breeds.

We are profoundly impressed when viewing a well executed statue by the imagination and skill of the artist. The sculptor forms in his mind a picture of the image that he wishes to express; then the image is modeled in clay and afterwards chiselled from stone or cast in bronze. The result is a likeness of a living form; it may be a charger, with ears and eyes alert, with dilated nostrils, tense muscles, the whole poise denoting readiness to respond to the touch of the motionless rider. Such a life-like picture in bronze is a great work of art, a triumph of human skill and ingenuity. But how much greater is the achievement of a breeder of an improved animal type! The sculptor must be faithful to nature and copy a figure that already exists. The breeder forms in his mind the picture of an ideal animal, as yet unrealized; his plastic material is living tissue; his materials, if combined with genius, and surpassing patience, produce an animal of a new form and having new attributes. He has created something, not merely a picture, that is good to look upon, but a living, breathing, moving animal, that is better for a certain purpose than any animal that was ever produced before, and that, most important of all, has the power to reproduce its kind. Improvements in animal types, and much of the improvement in the efficiency of animals have been wrought by these rare, skillful breeders.

The breeder does not work rapidly; the element of time is needful in all of his operations. His material can be changed and modeled but slowly. It was largely on this account that the work of breeders was relatively so fruitless until a little more than one hundred years ago. The breeder was denied the use of the indispensable element of time. After making a certain amount of progress, his material was damaged, or it was snatched from him by infectious disease. Nearly all of the great improvements in the breeds of animals have developed since the establishment of veterinary schools, and since animal plagues have been brought under some kind of control.

There was less difficulty on account of its isolated location in protecting the cattle of Great Britain from animal plagues than was experienced in Continental Europe. This is one of the important reasons why distinct, improved breeds of animals were established in Britain before they were established in other parts of the civilized world. Of course, the freedom of England from invasion by armed foes was an advantage to the breeder that also came from this isolated location, but in all times animal plagues have destroyed more animals and have damaged breeders more than wars and famines, because they have spread faster, and wider, and oftener, and because no opposition could be made to their progress and ravages. The losses that come from the prevalence of such diseases are well illustrated by the effects of contagious

pleuro-pneumonia, foot-and-mouth disease, and cattle plague, when through neglect of veterinary advice they did reach England and prevailed during the second third of the last century. It is estimated by Fleming and others that the actual value of the cattle destroyed by these diseases exceeds $600,000,000. (Fleming's estimate made in 1871 of $450,000,000 was for only a part of the period of the prevalence of lung plague and foot-and-mouth disease). And Fleming adds: "But these examples and estimates after all give but a slender idea of the devastation, misery, embarrassment and loss that have been due to our ignorance, apathy and neglect of the teachings of the veterinary and sanitary science, which must nevertheless claim the merit of having conclusively demonstrated that the most formidable diseases can be readily repressed or altogether abolished."

It has been possible to develop the Jersey and Guernsey breeds because the cattle of these islands have been protected from infections from abroad through regulations prohibiting the importation of live animals. Of course, this prohibition has at the same time been of service in helping to keep the breeds pure, but the chief advantage of these regulations has come from preventing the entrance of cattle plagues. The older breeds of the continent as the Simmenthal, Dutch, Brown Swiss and Normandy cattle, Merino sheep, Ardenne and Percheron horses have developed in more or less sequestered localities where they have been to a large extent exempt from prevalent plagues.

Improvement in breeding come, then, from continuous effort; and continuity of effort is an absolutely essential factor in breeding advancement. In this country we have lacked more than anything else continuity of effort. How frequently has it happened that a man has gathered together at enormous cost the best purchasable representatives of a breed. The stud, herd, or flock thus established if continued in competent hands for a number of years could not fail to be of enormous advantage to that particular breed. Unfortunately, however, such enterprises are often—I think I might say usually—short-lived.

In looking for the causes that are responsible for the melting away of these promising beginnings, I have found that disease is the chiefest. Let me illustrate. About twenty years ago, a considerable number of large poultry farms were established in the eastern part of Pennsylvania, in New Jersey, and other parts of the Eastern states. Many of these establishments were carried on successfully for a few years, and the outlook for continued success appeared to be very promising. None of these establishments is now in existence. I do not know of a large commercial poultry plant that is as much as ten years old. In nearly every instance, the reason given for the discontinuance of the business is that it became unprofitable on account of the prevalence of parasites and disease; the fowls died. When one considers the magnitude of the poultry industry, that the poultry yards of the United States produce more than the wheat fields, the extent of the loss from disease of poultry will be appreciated.

Innumerable ventures in swine breeding and in swine feeding have been ruined by disease. The keeping of hogs has been discontinued temporarily in many districts by reason of disease, very much to the detriment of the farmers in those regions, for there is nothing that can take the place in farm economy that is held by the hog. It is quite out of the question to attempt to fatten hogs purchased at a considerable distance and shipped on the railway. To ship hogs in stock cars and through stockyards is almost certainly to expose them to cholera, and can not be done, in a business way, except in case of hogs that are at once to be slaughtered. This fact is a severe check on the swine industry, although it is not always recognized as such. It was an Iowa farmer who said: "It is a good thing that cholera takes away ten million to forty million dollars' worth of hogs every year; if it did not, the price of hogs would be much lower than it is." It would be as reasonable to desire to keep up rents in a city by burning down a few hundred houses every year.

The parasitic diseases of sheep constitute such an intolerable drain on the sheep industry in some localities that sheep keeping has been discontinued, even in the face of a rising market for mutton and wool.

I have known several promising horse breeding ventures, started with good judgment in the selection of foundation stock, and at great cost to be ruined by the prevalence of abortion, navel-ill, osteoporosis and contagious pneumonia of foals.

An enormous number of herds of pure-bred cattle have been destroyed or scattered by infectious diseases, particularly by tuberculosis, abortion, calf cholera and contagious garget. I am familiar with the history in detail of a large number of herds in the Eastern states that were carefully organized, and that were of great promise until they were extinguished, or until the enthusiasm of their owners was extinguished by reason of the excessive prevalence of some infectious disease.

It is not alone the rich owner of high bred animals who is injured and discouraged by these maladies. Nothing can be more disheartening, or in a business way, more injurious to a farmer who has a large share of his means invested in animals than to witness the insidious effects of disease and the gradual depletion of his capital. Such men usually depend for their livelihood upon their flocks and herds. If these are impaired, they are unable to meet rental or interest charges, and innumerable farmers have in this way been carried into bankruptcy.

The average farmer is not, and is not likely to become, a breeder of pure-bred animals. Better breeding to the average stockkeeper means the elimination of the unfit and the purchase and use of occasional improved individuals, especially males, from the breeders of pedigree animals. The better the quality of such animals, the more moderate the price, and the less the danger attendant upon the introduction of such animals into the herd, the more the average stockkeeper will be encouraged to use them, and the more he will grade up his stock. If pure-bred animals of good stock are difficult to acquire, on account of their scarcity and high price, and if their purchase involves material risk of introducing a new disease, the use of such animals is bound to be restricted, and the betterment of the average quality of live stock of the country will be impeded.

One must admit that pure-bred animals of good quality are neither as extensively produced nor as widely disseminated in this country as is desirable. This is due partly to the lack of appreciation of advantages from better blood, partly to prejudice, partly to fear of disease and partly to the fact that there is such a limited number of successful breeders of pure-bred animals, and so many instances of men who have tried to breed pure-bred animals and failed, that there is a lack of sufficient number of inspiring examples. As I have shown a large proportion of these causes of failure trace back to disaster and discouragement from disease.

A hundred and fifty years ago it became evident to Bourgelat that there was need of careful study and teaching concerning the diseases of animals. The French veterinary schools were established upon his initiative, and this example was soon followed by all of the progressive countries of Europe. It was recognized that before there can be an improved agriculture there must be an encouragement of animal husbandry, and that the first step toward the encouragement of animal husbandry must be the protection of animals from avoidable disease. Thus it is that in the old world the veterinary colleges antedate the agricultural colleges, and it is for the same reason that the word "veterinary" has priority, for example, in the name of the Royal Veterinary and Agricultural College of Denmark.

The prevalent and most destructive diseases of animals when these veterinary schools were instituted were the very rapidly spreading, quickly developing, and in many instances highly fatal maladies, such as rinderpest, foot-and-mouth disease, contagious pleuro-pneumonia, anthrax, glanders and sheep pox. Some of these diseases from the suddenness of their onset, and their high mortality may properly be designated as explosive. Within a short time any of them may spread over a district and involve a large part of the animal population. All of these diseases have been brought under control by the application of knowledge developed by veterinarians, and taught in veterinary schools. Although occasional outbreaks of some of them still occur in civilized countries, none of these diseases prevails extensively at this time, except in remote, partly civilized regions or in restricted areas in civilized countries, and then usually for only a relatively short period.

The gain from this advance is immeasurable, as is shown by the fearful destruction wrought within limited areas by pleuro-pneumonia and foot-and-mouth disease during their occurrence in this country. Pause for a moment and try to estimate the condition that would exist here if these diseases had been permitted to escape beyond veterinary control. In the first place our export trade in live cattle would immediately have been extinguished. Second, it would be absolutely impossible to keep cattle on the open ranges, as is shown by the destruction of the cattle industry of Australia by contagious pleuro-pneumonia, a fact which forced Australia into sheep production. Third, the purchaser of cattle from a distance would be exposed to dangers similar to those that now encompass the men who purchase hogs that have been shipped through public stockyards. Every one who purchased a steer for feeding or a milch cow to add to his dairy herd would take the risk, which in many cases would be realized, of infecting his herd with a destructive disease. In other words the whole character of the cattle business of the country would be changed. The loss to the nation would be as great as from a war with a great power, and to cattle owners it would be unbearable. Fortunately, these diseases were not permitted to escape from control, and by the application of intelligent veterinary measures they have been completely extirpated. The veterinary profession does not receive from animal husbandry the credit for this achivement that is deserved.

As two other illustrations of advantage to animal husbandry from the application of discoveries in veterinary medicine I will refer to Texas fever and "milk fever."

Texas fever is a disease caused by a minute animal parasite that inhabits the red blood corpuscles of cattle. This parasite is carried from animal to animal by the Texas cattle tick. In the early history of the country this disease was each year distributed widely in the northern states by the introduction of Southern cattle. The nature and cause of this disease were discovered in 1889. Measures were at once taken to prevent the infection of Northern cattle, and with such success that Texas fever, formerly so prevalent, is now almost unknown in the Nothern states. Moreover, measures have been devised for the protection of Northern cattle taken South with such success that great numbers of breeding animals have been taken to Texas and other Southern states with the result that the Texas long-horn has been practically bred out of existence and Texas bred steers are now of such good quality that many of them have taken high prizes at the great stock shows in Chicago. Measures are now being taken—measures that have been developed by veterinarians—to exterminate the cattle tick in infested portions of the country. This work has been carried out successfully in some large districts, and, although the fight will be a long one, there is no reason to doubt that it will ultimately result in the eradication of this bovine scourge. The benefits that result from the measures already taken amount to untold millions, and it is estimated by Meyer that when the source of disease is finally extinguished the country will be better off to the extent of $100,000,000 each year. Then the South will become a great breeding ground for supplying feeders to the corn-growing states.

The other disease that I shall refer to is the so-called "milk fever," parturient paralysis or "dropping-after-calving." This disease has long been one of the principal destroyers of dairy cows of the first class. It is a disease that is most likely to take cows that are heavy milkers and while they are in the prime of life. It has had two especially untoward results: First, it has destroyed many, indeed, a large proportion of the most highly developed and most valuable dairy cows, and thus has prevented further increase in the produce of these exceptionally useful cows. Second, milk fever has seemed to establish a barrier to the evolution of the milch cow, as it has destroyed so large a proportion of the cows that reach or pass a given standard yield. In some good dairy herds the average mortality from milk fever was for many years higher than from all other diseases. By means of a simple treatment discovered by Schmidt, a Danish veterinarian, it is now possible to cure from 90 to 95 per cent. of all animals suffering from this disease. The gain to the dairy industry from this discovery is almost beyond belief. It amounts to at least a million dollars a year in each of the five leading dairy states of this country, and the saving and profit is sufficient to pay the interest on the entire bonded indebtedness of the Pennsylvania railroad. Surely

this discovery constitutes an enormous addition to our national wealth. The saving to the country is equivalent to a discovery of a new source of wealth, equal to an income producing investment of more than $150,000,000. This discovery has already saved to cattle breeders more money than has ever been paid in building, equipping, and maintaining all the veterinary schools of the world since the establishment of the first one in France in 1762. For this valuable discovery Schmidt has received several resolutions of thanks, and his Danish colleagues have presented him a loving cup! While the full credit for this discovery must go to Schmidt, it should not be overlooked that it was based upon knowledge of milk fever that had been gradually accumulated by veterinarians through a long term of years. So, strictly speaking, the discovery belongs to the veterinary profession, as indeed, must practically all the discoveries in the veterinary sciences.

In giving these illustrations of the value of veterinary research and veterinary teaching, I have tried by concrete example to demonstrate the intimate, although not always recognized reliance of animal husbandry on veterinary protection. I have tried to show that animals would not be as well bred and as efficient as they are were it not for the measure of veterinary protection that has been afforded; and I have endeavored, also to make it clear that animal husbandry would advance faster through improving the quality of animals by the encouragement of better breeding if a fuller measure of veterinary protection were provided. I have made a careful study of this question and I am sure that I am not overstating the case in the least degree when I say that **the greatest need of animal husbandry in the United States at this time is Better Facilities for Veterinary Research and Education.**

Other countries have recognized these needs and have taken effective measures to meet them. The old veterinary school at Hanover has recently been re-equipped at a cost exceeding 3,000,000 marks. The public has demanded this, and the government has willingly complied with this demand for no other reason than that the value of the work of the school is such as to merit the expenditure. For a similar reason Belgium has re-equipped the old veterinary school at Brussels at a cost of 6,000,000 francs. Hungary has provided a magnificent set of buildings for the veterinary college at Budapest, where all branches of veterinary work are provided for. The government veterinary schools of Germany, France, Austria, Hungary, Russia, Spain, Denmark, Belgium, Holland and Sweden are supported on a liberal scale, first, because these countries recognize their need of veterinary development, and, second, because the value of these schools is such as to fully justify the expenditures that are made upon them, and the provision of increased resources as needed for their growing work. Either of the two veterinary schools of Switzerland is better equipped and proportionately more adequately supported than the best veterinary school in the United States.

Then honor of making the first proposal for promoting veterinary science and instruction in America belongs to the Philadelphia Society for Promoting Agriculture. A prize of a gold medal was offered in 1806 for the best essay and plan for promoting such knowledge, both scientifically and practically. The announcement states that aid to schools and establishments for this, among other agriculture purposes, ought to be given by the national and state legislators, and adds:

"Investigations into anatomy, diseases and remedies for the preservation and improvement of animals on which our substance and comforts so materially depend must assuredly be considered worthy the most patient inquiry, intelligent observation and professional talents of the most celebrated among those who have devoted themselves to medical pursuits. As patriots it should stimulate their public spirit; as professional men nothing can more entitle them to the rewards due to their labors. Who is there among the most respectable of our own citizens, or in the highest grades of society in the Old World, who has not deemed it meritorious to promote the interest of agriculture? And is there any branch of that occupation so important as that now recommended to the notice and inquiry of medical men? If it has held an inferior rank in the classification of science and knowledge it is entirely owing to the unmerited neglect with which it has been unaccountably treated. It should be rescued from obscurity and placed among the most commendable and necessary branches of medical education."

During the following year, 1807, just a century ago, an address was delivered at the University of Pennsylvania by Dr. Benjamin Rush upon the duties and advantages of studying the diseases of domestic animals and the proper remedies to relieve them. Dr. Rush formulated under nine headings and for the first time in America, a series of powerful arguments in favor of developing studies of the diseases of animals.

It was not, however, until 1884 that the Veterinary Department of the University of Pennsylvania was established. For twenty-three years this school has taken a leading place among the veterinary institutions of the United States. It has educated 374 veterinarians who have taken the full course and have received its degree. It has now enrolled 111 students. In this body there is a considerable number of earnest young men from the farms of Pennsylvania, who are working hard to obtain their training in this fundamental knowledge underlying animal husbandry, and who plan to return to rural districts and apply the knowledge thus gained for the relief and advantages of agriculture.

The maintenance of the Veterinary School has thus far been provided by the generosity of a few philanthropic persons who have recognized the importance of its work, and by the loyalty and devotion of its teachers. The extent of the services that have been given gratuitously by members of the teaching staff of this school for a period of nearly a quarter of a century is most unusual. If they have succeeded with the assistance of their public spirited and generous friends in placing veterinary education in Pennsylvania on a sound and enduring basis, I am sure that they will be satisfied. And it begins to look as though they are succeeding, for the legislature at its last session appropriated $100,000 towards furnishing part of the equipment that the school urgently requires. But this provides for only a portion of its work, and some of its most important branches must still be taught in wholly inadequate, unsanitary premises. It is still unable to do for the state work that the state urgently needs.

There is coming to be more general appreciation on the part of breeders of veterinary work, of what it has done for them, and of the importance of the objects veterinarians are striving to attain.

There are several reasons for the slow development of this appreciation in this country. Perhaps the veterinarian has not been sufficiently insistent on the achievements of his profession and the value of his services; undoubtedly the schools have not been adequately equipped, and have not been able fully to meet the very moderate requirements that have been placed on them, so that the graduates of these schools have been handicapped in their efforts to aid animal husbandry. Furthermore, public support that might fairly be expected for this important branch of education has in some states—not in Pennsylvania—been diverted from veterinary schools, where it properly belongs, and where it should go, to weak and ineffective veterinary appendages to agricultural colleges or experiment stations.

It is the aim and purpose of the Veterinary Department of the University of Pennsylvania to make available and to distribute the information that is needed to afford animal husbandry the veterinary protection it requires for its development and expansion. It can do this by training and sending out educated, capable veterinarians prepared to cope with the ever-increasing problems in animal physiology and pathology that perplex and discourage the breeder. But the school needs help, and, while I do not doubt that it may confidently rely on your sympathy, I hope that it may also receive your active assistance.

Prof. Van Norman: Have you any questions on this paper?

Mr. Reichert: Mr. Chairman, may I have the privilege of making a motion? I have just learned that we are about to lose the valuable services of Dr. Pearson in this state, and to me, as a stock breeder, this seems like a calamity. I would suggest that the the Chair appoint a Committee to wait on Dr. Pearson, and find out whether there is not some way in which we can hold his services for the interest of the Live Stock Breeders of the State of Pennsylvania. If this can't be done, I suggest that we see the Governor, and ask him to give him a suitable increase that will keep him, and I move you, Mr. Chairman, that we appoint a committee of five to represent the Breeders' Association to take up this matter.

Prof. Van Norman: I will appoint that committee a little later. The Committee on Resolutions of both Associations is requested to meet in the little room to the right at the present time. And those of you who are interested, I want to call your attention before leaving the room to the butter exhibit on the table out there. While it is not all that we hope to have it some day, it is at least worth looking at. Note the difference in the packages and quality of contents. We will now take up the question of Alfalfa, by Mr. Wing.

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# HOW TO GROW ALFALFA

## An Address by Joseph E. Wing

I need a little courage to stand here and talk to you about alfalfa, coming from another state, with a different soil, and sometimes when I have gone away from home to show how to do it, I have failed. Now, here is Prof .Van Norman; I went up to the University of Wisconsin for two weeks urging him to get married, and here I find him in the same condition. (Mr. Bayard: That is his misfortune; not his fault.) If I failed so badly on so small a man, how can I hope to move so large a body of men as these farmers? But when I looked at this good-looking body of men—not necessarily handsome, but intelligent looking—I said to myself, "There is no doubt but what they can grow it."

Henry Miller, a butcher's boy, went to California and landed at San Francisco with fifty cents in his pocket (he has that fifty cents yet). He did not, as most men did who went to California at that time, go into mining, but he went into a butcher shop and saved his money until he had enough to buy a basket and stock it with meat. This he arranged neatly and cleanly, and then peddled his meat from door to door, and saved his money When he had established a nice trade he opened a little shop, where he kept his meats just as temptingly arranged. .Here, too, he saved his money, and then opened another shop, and then another, and another, until he had a dozen shops scattered over the city, and became its leading butcher. Still he saved his money, and then he bought a farm out in the San Joaquin Valley, a few miles out from San Francisco, and there he sowed the first alfalfa that was ever grown in California in a large way, and that was not very large ,either. I think it was about forty acres, and it cost him about forty dollars an acre, too. It cost him a lot because he did not understand about innoculation. He had seen the alfalfa in South America, while sailing to San Francisco. Then he got more seed, and tried again, and failed and then he sent to South America for seed, and tried it again and by that time the soil was innoclated, and he succeeded Then he got more land, then more cattle, then more land, until he has become a rich man; but I can't stop to tell you of the 100,000 head of cattle that Henry Miller has, all because he planted alfalfa.

I went west in 1876, not intending to farm it, but extending perhaps to the president, or maybe governor at least, or something of that kind, but the first thing I knew I found myself working on a cattle ranch in Utah. We had no alfalfa there then, and not for a few years afterwards, un'ess it happened to grow there. I think I brought it to that ranch first. But before I went there, I was in Salt Lake City, and walking up the street one day I saw a load of green hay, and I stopped and looked at it, and wondered what it was, it was so nice and green. I went over and looked at it, and it smelled just as nice as it looked. So I tasted it, and I said to myself, "It is good." Taste it, gentlemen, and see for yourselves, and if it is not good, I will give you some more My rule is to taste the feed I give my animals, and if it does not taste good for me, it will not taste good for them. I said, "That hay is all right, and if I don't get work for a while, I can always go out and buy a load of this hay and live on that till I get something to do."

Well, after a while we got some alfafa, and tried it on the ranch, and the cattle chewed it like a hired man chewing tobacco, and they maintained their flesh on it all winter, and thrived on it in summer, and before long we were feeding all our animals on it. And all the time I was dreaming of my father's little old farm of 196 acres down in Ohio. It was not very much of a farm, and it was not very profitable, but I loved it; it was my home; and nights and some days I would lie dreaming of it, and the old folks—a place so different from that big ranch. And after a while I began to wonder whether alfalfa would not grow there, and I sent my father about a pound of seed, and he sowed it. After a while I went back home on a little visit, and as soon as I had seen my father and mother, and my sweetheart, I wanted to see that alfalfa. I asked father where it was, and he told me it was out behind the barn, but he told me it was no good; it might do in the west, but it would not do here So I went out and looked at it, and it was only about six inches high. Father said, "You see I am right; it may do in the west, but it will not grow here." But I began to hang round; that is a way I have—to hang round until I either succeed or know why I don't. I am not sure that it is a bad trait, either. Well, pretty soon I saw the chickens come round there and pick at it, and I said to myself, "Ah, now I see why it don't grow any higher." Then I began to think that what it needed was irrigation, so I carried some water from the well, and watered that little patch, and then I took an old barrel which had one end in, and knocked the other end in, too, and set it over that alfalfa to see what it would do if given a chance, and went off to see my sweetheart, and forgot all about it for a while. When I thought of it again, and went to look at it, it had grown up through the top of that barrel. I called father and showed it to him; he scratched his head, and said, "Do you suppose I want to grow a crop that I have to put a barrel over?" But I said to myself, "If that one plant will grow, why won't a million grow?"

Well, it was not many years before I was called upon to go home and take charge of the place I didn't like to go, for I had been given some authority out on the ranch, and it makes a young fellow feel pretty important to be made foreman. I had to get up first in the morning, and get the bricks with which to get the other fellows out of bed, as you do when you are foreman; the only difference is that you have to work a little harder, and get a little more. But my father was old, and could not do the work any more, and so I had to go home. "Well," I said, "I will go home, and see whether I can't make a success of the old farm." I could see alfalfa, but nothing else, and when I came home from the west I brought with me seven sacks of alfalfa seed. But father said we could not afford to experiment, and we must sell that seed. Finally we compromised on a quarter of an acre, and I had seven sacks of seed! And I had an awful time selling that seed. I could not give it away: the neighbors would not have it I could not sell it; the seedsmen would not buy it. I advertised it, but it did not want to move. Finally I did manage to get rid of it by selling it in small quantities; now, some of these same seedsmen sell $30,000 worth of the seed in a season.

Well, that old potato patch was rich; the cattle had pastured there; the soil had been enriched by a cover crop, and I sowed my alfalfa and it grew. The next spring I sowed three acres; I picked out what I thought was the best land I had for the purpose; it sloped down towards the creek; a part of it was gravelly soil, and a part of it hard clay. Well, down by the creek the alfalfa did not do so well, and on the clay land where it was flat and hard, it did not do so well; on the gravelly soil it grew. And I scratched my head and said, "This old farm will grow alfalfa; I must manure the hard land and drain that wet land, and then it will grow alfalfa." Father had died in the meantime, and my brothers and I were running the farm, and we began to lay tile underdrains, until finally on that farm we had laid more than 14 miles of tile underdrains, and all the time we were feeding the stock in order to make manure to enrich the soil. During those years I was not trying to make money. I did not give it any thought. My brother Willis gave it some little more thought than I did, and perhaps it is just as well, as we might not have fared so well if he had not. I only thought to grow alfalfa, and I said, "I will have forty acres of it, some day." I have a hundred now.

I found we needed more manure, and I said, "I will buy lambs, and feed 200 of them, and sell the lambs in the spring, and make some money on them, and keep the ewes to enrich the soil." My brother said, "You must be crazy; do you want to run the farm into the ground?" But I got the lambs. First we had 200 lambs, then 300, then we fed 350, and we always had feed enough for them, and the farm grew fertile; it is the most beautiful thing in the world to raise lambs, and I said to myself, "Some day I will have on this old farm 1,000 lambs." I did not tell my mother, or my wife, or any one else, but I dreamed of my thousand lambs. Well, we got seven hundred—a thousand—fifteen hundred, and now we have sixteen hundred sheep on that farm, and are shipping alfalfa to the Philadelphia market. How do we do it?

Well, our soil was limestone, and I hauled manure on it until I got it pretty rich, and then I sowed alfalfa. I had not much faith that it would grow, but it did grow. That was in 18— well, never mind the date. Well, I gathered alfalfa three times a year, and sometimes four times, for five years, and by that time it had died out some, and we planted corn. Now, before you had the alfalfa about 30 bushels of corn was a fairly good crop; even after we had drained it, 50 bushels was a good crop, and if we got 65 bushels of shelled corn to the acre, it was a remarkable yield. After we had the alfalfa we made 80 bushels of shelled corn—twice the quantity—and I can assure you of fields where we made 100 bushels of shelled corn to the acre. The more alfalfa we grew, the better crop of corn we grew, and the more corn we got, the better crop of alfalfa. That was because the soil had become innoculated, and the bacteria are living there now. Last year we grew on our farm 300 tons of alfalfa, and we expect to grow 400 tons this year. That old farm has now 320 acres, and on that farm we harvested last year more than 7,000 bushels of corn of 75 pounds to the bushel, and 300 ton of alfalfa hay, and we save some of the land for pasture for our sheep, and for the cattle, and some good Percheron horses we have.

These alfalfa roots get down into the bottom of the soil, where it has been planted for a year or two years. The plant is a heavy feeder on nitrogen in the air, and at the same time you grow alfalfa, you enrich the soil. Now, what Prof. Hopkins said this afternoon is true. Alfalfa needs phosphorus, and last year we put on our farm from 200 pounds to 400 pounds to the acre, and actually doubled our crop, and we got $14 worth of crop for every dollar's worth of phosphorus we put on the soil.

This is what alfalfa has done for one farm. Don't you think I believe in it? When I started in in 1889, one old darkey and my father were sufficient to do all the work. Now on that farm my brothers work all the year round, and I work when I am home—and my brothers are good workers—and we have three married men working every day in the year, and we have a number of single men there, too, and I am glad to give them employment, because the more good people you get into your neighborhood the better your neighborhood. I walk out through the corn fields, and I see where a man has thrown back a clod of ground away from the corn, or where he has straightened the stalks, and I know what that man is. These things show faithfulness in a man, and these are the sort of men to have around you—people who take an interest in their work, and their surroundings. These men live there, and their little boys go to the village school with my boys, and their dinner pails are packed with the same food my boys have—they are filled with alfalfa.

Why, it is just as easy to grow alfalfa as it is to keep your sweetheart or your wife in love with you If you know, I don't need to explain it to you. If you don't, I will say that I have never found it requires any superior talent. She does not expect you to climb the roof of the house, or to do any great thing, but she does expect of you the little things that show your affection for her, and your thoughtfulness for her.

Now, if you will get into your minds a few things that alfalfa demands, I think I can help you get your farm started in growing alfalfa successfully. What are these few things absolutely necessary?

First, the land must be absolutely dry. Dig holes in it, and inspect them, and see if they fill up in wet weather. If they do drain it with tiles. Just lay your tiles as close together as you can, and then let them go Then take your manure spreader and give that field a thorough coat of manure, and turn it over thoroughly.

Let me tell you another thing: It is a surprising thing, I know, but it holds out. If, in plowing, you notice the blackbirds follow that furrow, alfalfa will grow there. The blackbirds follow the earth-worms, and where the ground is too poor to produce earth-worms it is too poor and too hard for alfalfa.

Your land drained, you must make it rich. Now, alfalfa is the greatest soil enricher that I know of, but it will not enrich poor soil. That is according to scripture, which takes from him that hath not, and gives to him that hath.

Down in Kentucky I planted more than a thousand little plots in the course of my work there. Some time ago I passed through that state, and as I sat in the train and looked out of the window, as the train wound around the curves of the mountains, perched up on the mountain side I saw a little cabin, and a young woman in a sunbonnet in the field near it. And I said to myself, "There is loneliness and privation." There is an old bone-grilled tobacco field or two, with some sassafras brush—just enough to keep life in that young man who has started up housekeeping with that young woman in the sunbonnet, and that old mule—and then the train went round the curve, and right there on the top of the ledge lay a little field of alfalfa, and then my heart was glad, for I saw better days ahead for that young couple. That alfalfa will enrich that old mountain soil, and he will have crops to take to town, and they will have comfort.

Now, I don't know anything that will enrich a soil quicker than alfalfa will, but you must give it rich land to start on. What do I mean by rich land? I would make it as rich, almost, as I would for a corn crop. Take off the corn crop, if you want, and then start right in on alfalfa. Another thing is, it must be grown on sweet land. More of the failures to grow alfalfa in Pennsylvania have been due to lack of lime in the land than to anything else. About a year ago, I was looking at some land down near Philadelphia. The land was rich, it was dry, but the alfalfa would not grow. It was lacking in lime; the soil was acid. You can put the lime there and make it sweet. The Experiment Station has not found it so but they may be wrong, for I do believe in the lime.

Now, these things are all you need. The land must be dry; the land must be rich, and the land must be sweet. The rest of it is just faith.

Then, how are you going to sow it? Let me tell you how we sow it. We sow it always in the spring, and we try to cultivate the crop of the previous year. In our corn crop we run a one-horse cultivator through it to rid it of the weeds, and it is important to get rid of the weeds early, before they spread and take a firm hold. When we have turned the soil, we work the lime in, and get the seed up by the middle of April, and we sow it always with a nurse crop of beardless spring barley. The seed is a little hard to get, but it is the best barley to sow, and it is wise to sow your alfalfa with a nurse crop of barley. It grows quickly and does not leave any stubble. Well we sow a bushel to the acre, and a peck of alfalfa—15 pounds of alfalfa to a bushel of barley When we harvest the barley we will cut the alfalfa down as far as it will go, and then we let it grow again. Now, as long as the alfalfa will grow the first summer we let it grow. There will come a time when it will look thrifty, and then get down on your knees right there on that alfalfa ground, and see if there are any new buds just starting out, and don't cut it until you see the new buds starting. It does not take long for a man to get down on his knees; it is a good thing for him now and then. Then, when you see the buds starting, you cut it. It will soon grow up again. We never cut it down close to the ground; we always leave about one-half of it, and we do not allow a wagon to pass over it, nor a horse.

Now, I have told you everything I know about alfalfa, except one thing, and that is, it will not grow without bacteria. Cream will not sour without bacteria. When I was out on the ranch, we used a great deal of clabber, and it made the men feel like fighting cocks most of the time. I have no doubt it was those fighting microbes that did it. But to grow alfalfa the ground must be inoculated. If your ground is inoculated, you will get a crop the first year; if it is not inoculated, you will not get your crop until the second year.

And while you are waiting for your ground to become inoculated the weeds come, so send to Washington, and get some of the bacteria. Some of these bacteria will be all right, and some of them will have been living on their wife's relatives. Then I would take some of the soil of the old alfalfa field, and some new soil, and I would sow these bacteria, and harrow the ground in the evening, after sunset, and all the rest is just faith.

Don't start in on a large scale. Try it with one acre, and when you have found which is the best land, you can try it with two acres, and then you can gradually increase your alfalfa crop. It is the best thing in the world for chickens, and for cows, for sheep and for colts. It is the best thing I have yet found to grow on the farm.

Prof. Van Norman: We will take a little time for the discussion of this subject.

A Member: I would like to ask the gentleman what his rotation is.

Mr. Wing: Four of five years of alfalfa, then one or two years of corn, and then we grow alfalfa again.

Mr. Mitchell: Do you continue dressing the land with manure?

Mr. Wing: Not unless the land is poor. We put manure in first, and then on some of the land that has not been properly treated, we use phosphate.

Now, just a word about alfalfa. Some of you may wonder how we plow. Now, it is easy. I don't know anything easier than plowing alfalfa. First, we put on a good team of horses, three horses, weighing about 1,600 pounds; then we put on them a good harness; then we get a good walking plow—a steel plow, with good, sharp, new shears. Then we get just one good Christian horseman and the thing is done.

Mr. Mitchell: How deep do you work the land when you plow the soil for alfalfa?

Mr. Wing: Why, one or two inches deeper than you ever plowed before. We would plow 12 inches deep, if we could.

A Member: Must you have limestone soil, or will it do as well to apply the limestone?

Mr. Wing: Appying the lime will do just as well. I am sorry you do not have the ground limestone here. I believe it would pay you to use it. Why, in Ohio and Indiana they are grinding this limestone, and selling it at a dollar a ton, and then applying eight or ten tons to the acre. That is nearly 100 pounds to the square rod.

A Member: When do you put the limestone on?

Mr. Wing: Well, quite a little time before you use the soil, so as to make it mellow

A Member: On fields that you have grown alfalfa, and it does not show up very well, would you try it again, or would you try another field?

Mr. Wing: Try it on the same field. Remember, you have some inoculation there, so go right ahead there.

The story of alfalfa is a very interesting one. In 1850 a Californian brought home some alfalfa seeds,, and they didn't grow. He tried again, and failed again, and his friends laughed at him. Nobody understood anything about inoculation. Finally, the chaff that fell upon these fields sprang up and grew, because the soil had become inoculated.

A Member: Will it grow for a few months, and then die?

Mr. Wing: Yes, sometimes.

A Member: Will the roots interfere with the tile draining?

Mr. Wing: Not unless it rains during the summer months, when it will fill them up.

A Member: In inoculating the soil, do you plow, or dig it up?

Mr. Wing: Dig it up.

A Member: How much soil to the acre?

Mr. Wing: About 100 pounds to the acre.

A Member: Where can I get alfalfa seed?

Mr. Wing: It is hard to get: I have none.

A Member: Is crimson clover bacteria the same as alfalfa?

Mr Wing: No, sir; the white, or sweet, clover is nearer.

A Member: I have heard that seed from Utah and Dakota is good.

Mr. Wing: Yes, sometimes that is very good.

A Member: What is the matter with alfalfa when it grows up about so high, and then turns yellows?

Mr. Wing: That is iron rust, and if that is the matter it won't grow.

A Member: Is alsike bacteria the same?

Mr. Wing: No, sir; it is not.

A Member: You recommend spring sowing; in the eastern part of the State we have been experimenting with fall sowing, and do grandly with it. I have alfalfa that measures 16 inches with just eight weeks' growth. There was no bacteria in the soil, but there was some white clover in that field before.

Mr. Wing: Now, a word about fall seeding. In some countries where more snow will be, fall seeding is all right. In Iowa, and some other states, it is better, but in other places it does not do so well. Now, you can do this; sow barley or some other grain with it; plow until nine in the morning, then harrow over it; plow at three in the afternoon, and at six harrow it, and you will not have the trouble with the weeds that you have the other way.

A Member: What is dodder?

Mr. Wing: A little vegetable parasite that grows around it.

A Member: Do you recommend top dressing for the winter?

Mr. Wing: I would recommend a light top dressing with fall seeding.

A Member: Manure, or what?

Mr Wing: Manure.

A Member: Up in Armstrong county our soils lack limestone. The soil is not acid, but it simply lacks lime. I put about 300 pounds of lime in one field, but where I grew alfalfa, the ground limestone was not so good.

Mr. Wing: I have noticed the same thing in the west, where they grow alfalfa.

A Member: After you have had a poor yield of alfalfa, would you re-seed that field?

Mr. Wing: I would not, unless I let it

grow for a year or two. And then, you know, you must cut it. Alfalfa will not grow unless it is cut two or three times in a season.

Mr. Young: What wages do you pay your farm hands?

Mr. Wing: I give my men $1.25 a day the year round. It is not very much you may think, but I never pay more than that.

Mr. Bayard: How deep must the soil be? How far from the rock?

Mr. Wing: It depends upon the nature of the rock. If you take a rock that is porous, the alfalfa will grow down into it.

A Member: If you had a fairly good showing in August, would you cut it close in the fall?

Mr. Wing: No; you want to let it be to protect the roots in winter.

A Member: Do you raise your own seed?

Mr. Wing: No; don't try to raise seed in Pennsylvania. We can't raise good seed this side of the Mississippi, one year in ten, and I will tell you another thing. The bees do not care for it here as much as they do in California; they make tons upon tons of alfalfa honey there.

A Member: Then you recommend western seed?

Mr. Wing: There is no satisfactory seed east of the Rocky Mountains. You want seed from the northwest. Now, about varieties; there is one variety that is brought from Turkestan, which may be a good alfalfa in regions where it is dry and cold, but it is not so satisfactory here.

A Member: Can it be successfully sown in a corn field when the last crop is planted?

Mr. Wing: I would not recommend it. We will rather take a field that gives a ton and a quarter of alfalfa hay, and one ton of barley hay to the acre, and then let it grow.

Now, gentlemen, I think we have about covered everything, and I thank you for your attention.

Prof. Van Norman: Just a couple of announcements, and then we will be ready to adjourn. Dr. Welsh will have something to announce.

Dr. Welsh: I don't know whether I have voice enough left to do it. I only want to say that the State College last night secured Prof. Alva Agee, of the Wooster Experiment Station, for our agricultural extension work, placing him alongside of Dr. Hunt and Prof. Van Norman.

Prof. Van Norman. The meeting now stands adjourned until this evening.

Thursday, January 24th, 1907.
7:30 P. M.

The evening session opened with Mr. Norton in the chair.

President Norton: We will take up the questions of Legislation on State Fair and Sanitary Inspection of Dairies.

Prof. Van Norman: The bill regarding State Fair is as follows, we might devote a moment or two to discussing it:

## AN ACT

## TO ESTABLISH A STATE FAIR COMMISSION, TO PROVIDE FOR HOLDING AN ANNUAL STATE FAIR, AND MAKING AN APPROPRIATION THEREFOR.

Section 1. Be it enacted, etc., That there shall be established a State Fair Commission, to be composed of the Governor of the State, the Secretary of Agriculture, the Superintendent of Public Instruction, the State Fish Commissioner, and other members to be appointed by the Governor, as follows: One from the members of the State Grange, one from the Pennsylvania Live Stock Breeders' Association, one from the Pennsylvania State Dairy Union, one from the Pennsylvania State Veterinary Medical Association, one from the Senate of Pennsylvania, two from the Pennsylvania House of Representatives, one from the Agricultural Experiment Station of the Pennsylvania State College, one from the Carnegie Institute of Pittsburg, one from the Franklin Institute of Philadelphia, and two members at large—one member representing transportation interests. The members of the State Fair Commission that are appointed by the Governor shall be divided into four classe, one of which shall hold office for one year; one for three years and one for four years. As vacancies occur they shall be filled by appointees, who shall be appointed for a term of four years.

Sec. 2. The Board State Fair Commissioners shall meet annually, the first Wednesday after the first Monday in January, in Harrisburg. The Board is authorized to elect from its membership a president and an executive committee; and from outside of its membership a secretary and a treasurer.

Sec. 3. The Board of State Fair Commissioners is hereby authorized to hold once each year a state fair, in or near the city of Harrisburg. The exact time and place for holding the same shall be fixed by the Board of State Fair Commissioners at the January meeting.

Sec. 4. The Board of State Fair Commissioners shall have the sole control of the state fair, and it may make such by-laws, rules and regulations in relation to the management of its business, as a majority of said Board shall from time to time determine, not inconsistent with the constitution and laws of this state or the United States.

Sec. 5. The Board of State Fair Commissioners shall appoint some person, not a members of the Board, secretary, and fix his compensation. The secretary shall hold his office for a term fixed by the Board, not to exceed four years; unless for good reasons he shall be sooner removed by the Board. He shall be eligible to reappointment when his term expires. The secretary shall perform such duties as usually pertain to the office of secretary, or as shall be required of him by the Board.

Sec. 6. The Board of State Fair Commissioners shall appoint some person not a member of the Board as Treasurer. and fix his compensation and prescribe his duties. The Treasurer shall give bond in such sum in such security as the Board shall direct. He shall hold his office during the term for which he is appointed. The length of the term shall be fixed by the Board, but may not exceed four years. He shall keep an accurate, itemized account of all moneys received by him and paid out, and make a report and full statement with the Board annualy, or oftener if required by the Board.

Sec. 7. The State Board of Fair Commissioners shall, after their annual meeting in January in each year, make and deliver to the Governor for transmission to the Legislature a report of their acts and doings, as required by law.

Sec. 8. Whatever money shall be appropriated for the purposes of a state fair, shall be paid to the Board of State Fair Commissioners, and may be expended by them as in the opinion of said Board will best advance the interests of agriculture, live stock breeding, dairying and horticulture, manufacture and domestic arts in this State.

Sec. 9. The Board of State Fair Commissioners, in that name, may contract and be contracted with, may purchase, hold or sell property; may sue and be sued in all courts or places, and this State shall not be liable for any debts or contract of said Board. The title of the property real or personal, acquired and controlled by the Board of State Fair Commissioners shall be vested in the Commonwealth of Pennsylvania, and shall be free from taxes.

Sec. 10. The members of the Board of State Fair Commissioners shall receive no compensation for their services, either directly or indirectly, but their actual and necessary traveling and hotel expenses, while going to and from, and while in attendance upon the regular meetings of the Board, may be paid upon presentation of a specifically itemized bill and after approval by the president of the Board.

Sec. 11. Whoever shall keep any shop, booth, tent, wagon, vessel, boat or other place for the sale of spiritous liquors, or expose for sale, or sell, give away or otherwise dispose of any spirtuous liquors, or engage in gaming or conduct any indecent or immoral exhibitions at or within one mile of the place where the state fair is held, shall, for each offense, be fined not less than $25, nor more than five hundred dollars; Provided this section shall not affect hotel keepers, distillers or others exercising their calling at their usual place of business.

Sec. 12. Any person violating the provisions of the preceding section may be arrested upon view or upon warrant, by any sheriff, constable or other officer authorized to make the arrest; and such officers may also seize the booth, tent, wagon, vessel or boat, and articles used for gaming to be sold, and convey the same before a justice of the peace, with the offender, and upon a judgment being rendered against the offender the said property may be sold upon the execution issued upon such judgment; and if sufficient property is not found to satisfy such fine, the offender may be committed to the county jail until the fine and costs are paid, or the prisoner discharged according to law.

Sec 13. The sum of one hundred and fifty thousand dollars ($150,000) is hereby appropriated to the Board of State Fair Commissioners, for purchase of a site. the preparation of the same, and for providing such permanent equipment as may be necessary for holding the state fair. The sum of fifty thousand dollars ($50,000) is hereby appropriated to the Board of State Fair Commissioners for the payment of premiums to exhibitors and for meeting other necessary expenses in the conduct and management of the fair.

The funds here appropriated shall be paid by the State Treasurer on a warrant of the Auditor General, in the manner now provided by law.

Specifically itemized vouchers, covering every item of expense made under this appropriation, shall be filed with the Auditor General.

Sec. 14. All acts and parts of acts inconsistent with the provisions of this act, are hereby repealed.

President Norton: In answer to this question, I would state that the State Fair at Bethlehem is not a State Fair Association. It is simply incorporated under the name of the State Fair. There was an act passed in 1852 appropriating $2,000 a year towards the State Fair, and they are drawing that appropriation still, but they have no State Fair.

Mr. Fenstermaker: It is not good policy to speak against your neighbors, and I don't want to do it, but that fair was simply incorporated to run opposition to the Great Allentown Fair. It is more of a horse-racing affair than anything else.

President Norton: If there is no more discussion, we will pass on.

Mr. Clark: Should not this bill be brought regularly before this body for endorsement?

President Norton: Well, we had better have the endorsement, and if any one makes the motion, it will be properly acted upon before we take up Dairy Legislation.

Mr. Clark: I make a motion that we bring this bill properly before the house, with the addition of a member of the State Board of Agriculture to the Commission.

Theasurer Lantz: The act creating the State Agricultural Society was passed in 1847. It should have been done away with when the act was passed creating the State Board of Agriculture. It has no relation to the State Board of Agriculture, but that does not prohibit the Board from co operating with the State Association on the question of the State Fair.

Mr. Herr: I was present when it was drawn up, and the Commission included one member from the State Board of Agriculture. Has it been recorded? I didn't hear it.

President Norton: The bill was gotten up by the Secretary, but has not been printed. I will have it amended.

Mr. Fenstermaker: I can substantiate what Mr. Herr has said.

A Member: Is Poultry represented?

President Norton: There is no State Poultry Association.

Mr. Nelson: The State Apiarists should be represented The organization was completed this year under Prof. Surface.

Dr. Conard: There is a new Poultry Association, which was recently organized in Philadelphia. Mr. J. D. Nevius was here today as delegate from that organization, and was made a member of the State Board of Agriculture, and given recognition at this meeting He is the Secretary of the Poultry Association; I am not sure of his address, but think it is somewhere in the Mint Arcade, Philadelphia.

President Norton: In regard to the State Board of Agriculture, I would say that this is an oversight. In moving the files, I could not find the bill, that was presented to the House and this copy was made from an old bill that I had at home. I know the State Board of Agriculture, and I think the Poultry Association, were represented.

Mr. Mitchell: The old State Fair that held its meetings at Bethlehem, has that been abandoned? Or is it still in existence?

President Norton: I might add that the last section of this bill provides that all acts inconsistent with the provisions of this act are hereby repealed. Has that motion been seconded?

Properly seconded, and agreed by the house to endorse the bill.

President Norton: The next subject is the Dairy Inspection law Prof. Van Norman will read the bill to us.

Prof. Van Norman read the bill.

A Member: I would like to know under

what conditions the farmer is to produce that milk.

Prof. Van Norman: Ordinary common decency. If you are giving your cows slops, or have them standing in manure up to the flanks, or give them drinking water from stagnant pools, or from streams into which the drainage of the farm yard goes, these things will have to be done away with, and the milk produced under decently clean and sanitary conditions.

Secretary Critchfield: I must confess that I was not listening as attentively as I ought to have done. What effect will this have on the retired farmer who rents his farm and lives in town, and sells his milk to his neighbor?

Prof. Van Norman: Well, if the inspector goes to his place, and finds it in a filthy condition, it will be published, and he will receive no license until he rises to the dignity of a milk wagon.

Mr. Herr: It seems to me that the provisions of this act will require an army of inspectors. We are trying to get these things as simple as possible, and I don't think there is as much danger from impure milk in the country as in the city. We have been trying to keep clear of these things in the country, but if this thing goes on, after a while we will have to sterilize our milk before they will take it from us. I don't believe that these things are so necessary in the country. If it gets in the hands of the proper people, it will be all right, but if it falls into the hands of people who are hunting trouble, there will be a whole peck of it.

Prof. Van Norman: This bill provides that the inspectors must be men who are duly qualified and approved for the position. Now, Brother Herr is in the same condition as I am as referred to by Mr. Wing today, and a man who lives alone is perhaps in danger of seeing only one side of things, but if he will come down to State College, and see the milk as it is taken from the platform, we will show him the other side of them.

Mr. Clark: Might I just ask a question for information? I do not hear very well. Do I understand that our farmers who load up this milk, and haul it out—are they subject to this license?

Prof. Van Norman: If they peddle it out they will have to pay a dollar a wagon and receive a license carrying with it the certificate of the inspector.

Mr. Clark: In reference to this sanitary inspection, I think I will like it; I think it will be a good thing. It is often a necessary one, as I will show you. Now, the farm next to mine belongs to a wealthy Pittsburg gentleman; in fact, I sold it to him. He stocked it with some fine dairy cows, and put a man there to care for them, and milk them, so that he could have clean, pure milk shipped him in the city. He told me this story himself. One day he came out to look over his farm, and went into see his man milk. And this is what he saw: The man's time and hands were about equally divided between milking, and blowing his nose—not into a handkerchief, but into the air. And he was paying this man $2 per day to supply him with clean milk. He discharged him, and got another man, but he said, "I will have to hire someone to watch him—but who will watch the man who does the watching?"

Mr. Barber: Is there any law regarding quantity? Some of us are compelled to sell milk dry measure, and then they peddle it out liquid measure.

Prof. Van Norman: There is another bill before the Legislature now on that question.

(This was later enacted into law.)

A Member: I am not selling any milk outside of my own, but I don't think you can compel a man to pay license to peddle milk. They tried it once in Harrisburg, but it did not work.

President Norton: That was simply a city ordinance; this will be a state law.

A Member: No, sir; if you will pardon me, it is in the state law; the city ordinance was not in force at that time, but the state law was already in effect.

A Member: How would it affect the people of New Jersey and Delaware, who are shipping milk into this state?

Prof. Van Norman: It would probably have no effect upon them outside of the local authorities refusing to receive milk that was not properly inspected.

On motion, duly seconded, the bill was presented for endorsement by the house, but the vote resulted in a division.

President Norton: I would say that this law is a good deal similar to the Wisconsin law. If Mr. Herr will go to any creamery in the state he will see that 50 per cent of the milk is dirty. I am a practical creamery man myself, and have the handling of from twenty to thirty thousand pounds a day. I think Mr. Herr is mistaken when he thinks all the farmers produce clean milk. This law is a good thing; it is working well in Wisconsin and Michigan, and will, I think, work well here. Since there is a division, I will call for a rising vote.

A Member: Will you kindly inform me, who is entitled to vote?

Secretary Critchfield: Every member of the Dairy Union who has paid his initiation fee, and his annual dues is entitled to vote. I should think that all those who are members of the Breeders' Association should be allowed to vote, but, strictly speaking, only members of the Dairy Union are entitled to do so. The members will please rise, and stand until counted.

A count of the rising vote, proves that the ayes are in the majority, and the bill, therefore, stands approved as read.

Prof. Van Norman: I think when you vote against a thing you should rise and give your reasons for so doing.

Mr. Herr: I would say that it is unconstitutional to tax me for selling my own produce. If you can tax me for selling milk, you can tax me for selling apples or any other farm produce. If I am a dealer you can do so, but you can't tax me for selling my own produce.

Prof. Van Norman: We will now have a paper by Mr. J. H. Reichert, of the Scranton Correspondence Schools, on "A Profitable Method of Marketing Milk."

# A PROFITABLE METHOD OF MARKETING MILK

## By J. H. Reichert

There are many farmers and dairymen keeping cows at little or no profit because the price they receive for their milk is entirely too low when compared with the present trust prices for grain and labor difficulties. The key to the situation then is, of course, a better market, or better prices for our milk. In most cases, before this market and price can be secured we must arrange for more modern methods on the farm for the production of clean wholesome milk from healthy cows. Some of the things necessary are: Your barn must have some method of ventilation; no matter how old the barn, the man who reads (and no farmer or dairyman should be without four or five of the best agricultural and dairy papers) can devise some plan to do this at small cost. The barn should be whitewashed every 60 days at least, the barn and cows must be kept reasonably clean, the cows should be tested annually for tuberculosis, not only as an aid to a better price of milk, but as a matter of self-protection. The udders of the cows should be wiped with a damp cloth before each milking. The milk should be removed from the barn, and cooled as soon as a cow is milked, if possible, and kept very cold—say 45 degrees—until shipping time. I know that there are many farmers anxious to follow better methods but are restrained from doing so because of the expense connected, and a feeling that they can not procure a sufficient increase in the price of milk for the trouble and expense involved. In answer to the matter of expense, I would say, that with a proper system of doing this extra work, the expense of caring for cattle and barn in a reasonable, sanitary manner, need be but a trifle larger than the cost of doing so in the ordinary slip-shod way.

At Willow Glen Farm, we seem to have a fairly good system of ventilation for a 100-year-old barn. We keep the cows clean and whitewash the barns once a month in summer and every 60 days in winter, with a spraying outfit; this is done by the regular farm help in less than one-half day. At milking time we have a bucket and cloth back of each row of cows, so that the udders can be wiped before milking. I am sure this adds no cost, but makes the milking more pleasant, because the udders are clean. I have never seen the milker who did not become disgusted with a dirty udder. I know of no class of people who are slower to respond to progressive methods than my own, the Pennsylvania Dutch, yet these people follow the weighing of the milk, and the wiping of the udders religiously, because they see the value of it. It is plain to be seen that with me it adds but little, if anything, to the cost of production, but adds considerable to the value and wholesomeness of our milk and gives us a ready market at one cent a quart above the regular price. Let us see how this would figure out in a 5,000-pound cow. Five thousand pounds of milk would give us approximately 2,390 quarts.

2,390 quarts @ 4c ............$ 95.60
2,390 quarts @ 5c ............ 119.50

or an increase of $23.90 per cow for clean milk. In a 20-cow dairy, the difference would amount to $478 annually.

I appreciate the fact that so long as the farmer leaves himself entirely in the hands of the middlemen, he must take the price offered, regardless of quality. There is, however, in every community, a ready and growing demand for better milk for which at least two cents above the average price can be secured, and milk produced in the manner described is worth all, and more, than the additional two cents a quart that is asked, and people will welcome an opportunity to get such a product if the farmer can bring the superiority of his product to their attention. After having made arrangements to follow reasonable sanitary precautions at Willow Glen Farm in the production of our milk, I went to two nearby cities and saw the retailers and explained the kind of milk I had to sell, and soon discovered that the retailer was anxious enough to handle such milk if he could procure it just as cheaply as the "don't care how" produced kind, but absolutely unwilling to sacrifice any of his profit, so long as the public was satisfied, or at least stood for the imposition. I then looked around for a man willing to go into the milk business on a reasonable profit basis. Arrangements were made to place the merits of our milk before the people, a nice descriptive circular, with a mailing card for a request to have our man deliver a sample bottle was put into each circular, and these circulars covered the following points:

1st. This milk is produced from a tested herd, absolutely free from tuberculosis.

2nd. A certificate from the local veterinarian who tested the herd, also a statement from him in regard to the sanitary condition of the barn, etc.

3rd. An explanation showing the importance of clean milk from healthy cows to babies and invalids.

4th. Instructions to consumers how to take care of milk after it was delivered to them and explaining the danger of allowing milk to become contaminated.

A letter enclosing the circular was also sent to each one of the physicians in town.

Although we did not have a single customer before we started, when we were ready to deliver we had orders for 150 quarts daily, and at the end of 30 days we had sale for all we had at that time—200 quarts daily. We have received for our milk five cents per quart, delivered at the station. This milk was retailed at eight cents a quart—two cents higher than the average price for milk.

In a town where ordinary milk sells for eight cents, ten cents can easily be procured for milk of this quality. In other words, in order to market milk at a profit, the farmer must arrange for the production of milk cleaner and better than the average; and second, carry on an advertising campaign to educate people to appreciate good milk and to believe in his particular product. A proper advertising campaign like the above, can be carried out anywhere for a sum not exceeding fifty dollars.

We, as farmers and dairymen, need to learn the value of advertising in order to create independent markets for our products. If a man has something good to sell, he himself must reach the public and create a demand. In this way only can we secure decent treatment and fair consideration from middlemen. The man who builds up a reputation for his own goods can generally dictate his own terms.

An increase of a cent, or a cent and a half per quart, is quite an item, and is sufficient to make many dairies that are not now profitable, earn at least a satisfactory dividend for the dairyman or farmer. I believe that work of this kind would stimulate the dairy business in many communities. If we are ever to get better prices for our products, we must teach the public that there is more than one kind of milk. Once people know how to discriminate, there will always be a demand for the better milk and at better prices.

Do not let the fact that you are not close to a town or city discourage you from making an earnest effort to secure for yourself better profits as a producer of dairy products. This will enable you to surround yourself and family with more of the things that go to make farm life pleasant and helpful to all connected with it. The plan outlined by me, and followed by myself, will enable you to ship milk at a profit if you live four miles from the railroad, and one and three-quarters hours by rail to the town where your milk is to be sold. I mention these distances because I have proved that within these limits, at least, this plan can be carried out in a very satisfactory manner to all concerned, producer, retailer, and consumer. Prepare to produce a good article, and then tell its merits over and over again until the public will believe in its superiority as much as you do yourself.

Now, I shall be glad to answer any questions, and I will say to all of the farmers, I think that if there is one class of people who has the good of life, it is the farmers, and I think a man who understands dairying, is fitted to stand shoulder to shoulder with any class of professional men in the country today. If you have a good article, why not talk about it, and tell its merits, until the people believe in it, too? If you do this, you will rise to a higher and better level.

Prof. Van Norman: If any one has any questions to ask, we will take a few minutes, after which we will hear the report of the bacteriologist who has examined the milk sent here—Prof. Weld, of Washington.

Mr. Comfort: While the bacteriologist is arranging his samples, I will ask the gentleman who gets 5 cents for his milk what it averages in butter fat?

Mr. Reichert: I would say that it averages 4.7; often it goes higher. Do you think we sell blue milk here among the Pennsylvania Dutch?

Mr. Comfort: You are getting five cents for it; I simply asked for information, and this is the information.

Mr. Roberts: To corroborate what Mr. Reichert has told you about receiving five cents for his milk, I will give you a little experience in the Philadelphia market that I had in the past few years. I had been receiving from $1.20 to $1.60 per hundred pounds, but I thought my milk was worth more than that, so I went to see a private party in Philadelphia, guaranteeing that my milk would contain 5 per cent butter fat. I have since been receiving five cents a quart the year round, instead of shipping to middlemen at three and a half cents. It shows that you can find the trade if you hunt for it.

Mr. Powell: I began my dairy business in the manufacture of cheese, and I get 6 cents where the others get 5 cents. If you have a good article you can find a market for it, but you must be careful to keep up the standard. If you fall below once or twice you will lose the market.

Prof. Van Norman: We will now have the pleasure of listening to Prof. Weld.

Prof. Weld reported as follows on the samples of milk sent for examination:

## RESULT OF MILK AND CREAM CONTEST

### By Ivan C. Weld, Dairy Division, United States Department of Agriculture, Washington, D. C.

I am very glad to have this opportunity to meet with the dairymen of Pennsylvania, and to discuss with you a subject that is closely related to your prosperity as dairymen, and to the general welfare of the community as a whole. We are a milk consuming people, and it is a significant fact that the human race for many years has been becoming more and more dependent on cows' milk for food. That our dependence on the cow for this food will increase as time goes on, we cannot doubt. As dairymen, as producers of market milk, you are expected, for a just compensation and a fair profit, to feed the people. You must then, for your own benefit as producers, keep in close and sympathetic touch with the consuming public. You must ever be ready to anticipate the wants of the consumers, and to supply those wants, if you would secure and hold their confidence and win for yourselves a profit in your business.

It is for your best interests that the consuming public have absolute confidence in you and in your ability to produce and to deliver into their hands a food product that is pure and clean. It is a long time since it was discovered that cows' milk was good for food. It was one thing for primitive wants, but it is quite another problem under present conditions to produce and transport long distances milk that shall satisfy the appetite of the millions of human beings who have never milked a cow and perchance have never seen one.

It was evidently intended by the Creator of all things that milk should be furnished to the young without ever coming in contact with the atmosphere, and foreign substance or thing whatsoever. Under such conditions, all agree that milk has no perfect substitute. When, however, man makes his hands take the place of the calf's mouth and the milk, instead of going directly to the calf, passes through the air into a bucket, he has interfered with the natural process, and the condition of the product when it reaches the consumer will depend almost entirely on the conditions under which that milk was secured and cared for. The producer is largely responsible for those conditions, and he should accept his responsibility like a man.

In the great interest and haste in matters pertaining to the breeding and feeding of dairy cattle for the last dollar obtainable, the sanitary side of the dairy business—the matters that pertain to the health of the cow and the health of the consuming public—have, in many localities, been neglected. Neglect, however, could not always remain covered, for the natural result of uncleanliness in any kind of work must sooner or later make itself known. Thus it is that

negligence or ignorance on the part of some one is occasionally uncovered in various parts of the country by the discovery of disease in herds of dairy cattle, or among people who have obtained their food supply from a common source.

Many dairymen now know and many others have yet to learn something of the nature and influence of even a little dust in the air of the stable, or a little loose dirt or hair on the cow's udder and flanks at time of milking. Many dairymen now know and many others have yet to realize that a milk pail, strainer or can that has not been well cleaned may become a source of trouble.

Many dairymen now know and many have yet to learn that even a very small piece of dirt, a hair or a fly falling into the milk carries with it many thousand small plants which find in the milk conditions well suited to their growth and increase. Dairymen, as a rule, are careful to strain out these visible things when by some accident they get in the milk. If these little plants or bacteria were only large enough so that the dairymen could see them, he would doubtless remove them also. Unfortunately he cannot see them or remove them. Hence it becomes the part of every honorable milk producer to observe and practice such methods as will keep bacteria out of the milk, so far as it is possible to do so.

Second only in importance to cleanliness in all its details is the matter of the prompt and efficient cooling of milk. The cooling cannot take place too quickly after the milk leaves the cow, neither can the temperature be made too low, provided, of course, that the milk is not frozen.

The dairymen who are today furnishing the best milk to our city markets are the dairymen who are most exacting regarding the conditions of cleanliness and low temperature, and I may also add they are the dairymen who are making the most money.

Unfortunately there are various standards of cleanliness among producers, as well as among consumers of market milk. Conditions which may be acceptable to one person may be offensive to another, hence the desirability of producers occasionally exhibiting their products at dairymen's meetings, and having those products carefully examined and scored according to definite and well established standards of excellence. If there can be friendly rivalry among the dairymen for the highest score and honors, so much the better, as that helps to stimulate and to encourage the consideration of conditions which make possible the production of a cleaner and higher priced product. You have done well to start such a movement in this Dairymen's Association. There is much yet that remains to be learned in connection with the production and distribution of milk and this Association, by encouraging exhibits of milk and the discussion of influences and conditions affecting its production and distribution, can do much to promote the interests of all milk producers in this state. You will also render a public service—a service that should entitle you as an Association to public recognition and support.

Although the number of entries in the first exhibit is not large, a beginning has been made that should eventually lead to substantial results.

In discussing the method of scoring these samples, let us first consider the matter of flavor. Forty points out of 100 are given to this, because flavor or taste is a very important thing in milk; no matter what other desirable qualities it may possess, if it does not taste good no one cares to use milk for food.

Composition, that is the percentage of fats and solids not fat, are given 25 points. It is important that the quality of the milk be good and up to established standards.

Under the head of keeping qualities is considered the number of bacteria per cubic centimeter, and the degree of acidity or sourness that has developed. It is important that the number of bacteria be within such limits as will ensure the healthfulness of the food. An excessive number may also affect the keeping qualities, while the amount of acid developed indicates to what extent, if any, the milk has already soured. The number of bacteria may also be considered as an indication of the degree of cleanliness and care which is practiced by the milk producer.

The appearance of any article offered for sale has an effect on the consumer and also influences the selling price. It is, therefore, important that milk be put up in clean bottles, that the bottles be free from metal parts, that the caps fit tightly and present a neat. appearance. There is also another thing considered in judging milk and that is the matter of sediment Now, sediment is something that should never be found in milk. Unfortunately it is oftentimes present, and when found its appearance in the bottom of the bottle cannot fail to be disgusting and repulsive to the consumer.

All the above conditions are considered in detail, and the score of the milk is affected according to the conditions found.

The conditions found by me in the milk exhibited at the meeting have been plainly marked on the score card, which can be found with each exhibit. The summary of these conditions, including a few samples purchased on the streets of Harrisburg, are as follows:

**Report of Milk and Cream Samples Exhibited at the Meeting and Purchased on the Streets of Harrisburg, Pennsylvania.**

| No. | Fat. | Total Solids. | Acidity | Flav'r | Appearance | Bacteria per C.C.. | Score. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| 1 | 4.90 | 13.88 | .198 | 33 | 10. | 925,000 | 84. | |
| 2 | 4.80 | 13.63 | .188 | 35 | 10. | 539,200 | 90. | |
| 3 | 30.50 | ..... | .183 | 36 | 10. | 44,100 | 96. | Cream. |
| 4 | 4.20 | 12.79 | .181 | 34 | 9. | 640,000 | 87. | Sediment. |
| 5 | 6.00 | 14.95 | .175 | 32 | 9.5 | 1,370,000 | 79.5 | Slight sediment. |
| 6 | 10.50 | ..... | .144 | 34 | 10. | 190,000 | 85. | "Cream." |
| 7 | 5.20 | 14.24 | .189 | 34 | 9.5 | 850,000 | 86.5 | Slight sediment. |
| 8 | 9.00 | ..... | .192 | 33 | 9. | 11,200,000 | 58. | "Double cream." Sed. |
| 9 | 3.60 | 12.57 | .19 | 30 | 7. | 3,789,000 | 62. | "Past'r'd." Much sed. |
| 10 | 4.60 | 13.02 | .19 | 34 | 9.5 | 4,400,000 | 68.5 | Slight sediment. |
| 11 | 10.75 | ..... | .195 | 30 | 9. | 5,706,000 | 56. | "Cream." Sediment |
| 12 | 4.20 | 13.04 | .204 | 35 | 8. | 1,075,300 | 82. | Sediment. |
| 13 | 5.30 | 13.86 | .174 | 34 | 10. | 861,000 | 86. | |

President Norton: I have asked Dr. Pennington, of Philadelphia, to say a few words to us.

Dr. (Miss) Pennington spoke as follows:

## ADDRESS BY DR. PENNINGTON

The consumer has a side as well as the producer. Now, we get milk in the City or Philadelphia, and we are doing something in the way of experiments. What we are doing is very small, but I feel the results warrant the continuation of the work, and I think it is doing good. The experimenters are bringing in samples direct from the platform to us in the laboratory, as well as those that come to us through middlemen.

So far as adulterations in it are concerned, we have found very little boric acid, or other adulterant. I think the figures for 1906 are five-tenths of one per cent in the City of Philadelphia.

On the other hand, we have to contend with what Dr. Weld has shown us in the bottom of the jar—manure. That is what we have to contend with, and what I shall speak of, because I think if it is brought to your attention it will make it easier to overcome some of the difficulties that are connected with the shipping of milk. There is no real need of its being there, but it is not so easy to discover.

Then we have another form of organic matter to contend with— ;dyspeptocoeci they get into so many of the cells in the milk that we have strictly a form of pus. We find a large percentage of the milk coming into the city that contains these things, and it is injurious to the health of the community. You might as well feed your babies on poison. The adult is in danger as well, but they are not so susceptible as babies, although they often succumb. I examined last year about 10,000 samples and about 20 per cent of these samples contained snd—something which made the milk unfit for use as food.

Now, I don't think it is a very difficult matter for us to alter these conditions. If we keep the cows reasonably clean, and the milking reasonably clean, and the utensils reasonably clean, there is no reason why these conditions should exist. The milk is being sorted out by the middlemen, and when the housewife gets it it looks reasonably clean. The housewife does two things when she gets the milk: she looks for the cream, and she looks at the bottom of the jar. If that looks all right, it substantiates the purity of the milk, in her opinion. Now, the sediment does not settle in the bottom. They have it filtered, but they do not get it all out, and it is mixed with the milk. From an aesthetic point of view it is not pleasant to contemplate it, but from a sanitary point of view, it is the bacteria that do the harm.

We hear a great deal about Pasteurized milk, but Pasteurizing will not kill all the bacteria. Keep the milk cold; keep the utensils clean; bacteria do not thrive in the cold. And then it can be shipped so as to be a palatable and a healthy food. If such conditions can be obtained by dairy inspection such as has been proposed here tonight, it is the best thing that can be done, because there is at all times a market for a good article. I am quite sure that the City of Philadelphia is willing to pay for a good article. The market is there, and the people need these things more perhaps in large cities than anywhere else, but they need them everywhere. Milk has for a long time been produced so dirty that I am afraid the general public prefers it dirty. Just let me tell you an incident that I know to be true:

A producer near the city produces a milk guaranteed to contain less than 10,000 bacteria, and which ordinarily contains less than 2,000. It also contains about 5 per cent butter fat. One of this producer's consumers' complained that the milk had no taste; it tasted more like skim milk than anything. This consumer was asked to visit the dairy, and was given a glass of milk. He said that was just exactly what he complained of—the milk had no taste. The proprietor gave him another glass of milk from a second bottle. That he said was better. but not quite right. Then he gave him a third glass, from a third jar, and that, he said, tasted just right; that was exactly the thing he wanted. Then the proprietor explained just what he had done. The first glass was pure milk—as clean as it could be made; in the second glass he had mixed a small piece of manure, and shaken up the bottle well, and in the third, he had put in quite a large lump of manure, shaking the bottle thoroughly, so as to mix it well—and that suited the consumer. I think we need to educate the consumer

Prof Van Norman: After the next talk, by Prof. Christie, on Corn, we will have an auction of the corn out there. We all know the good work that is being done in our neighboring states in the way of growing corn, and we know the man who is doing the work. A disciple of that man will present to us some of the methods of work, and its results. This young man has worked for several years under Prof. Holden, the corn wizard of the West. I now have the pleasure of presenting to you Prof. Christie.

## CORN GROWING

### By Prof. G. I. Christie, Indiana Experiment Station

Mr. Chairman, Ladies and Gentlemen: So many times have I heard speakers in the last few days say they were glad to be here, and congratulate the people of Pennsylvania on being such a good-looking lot of people, that I have come to the conclusion that we are about the only people, and I am glad to be here.

When people rise to the very pinnacle of fame, as some of us think we have done, they usually make their own terms, and when I am asked to make an address, I usually tell them that I have two rules without which I will not speak; the first is, I must have from two to three hours' time in which to tell what I want to say, and the second is, that I will not talk after nine o'clock in the evening. I must break both of these rules tonight, as I want to let you go home, and it is already considerably after nine o'clock.

It seems ridiculous for me to come here

and tell some of you people who have grown corn more years than I have lived, how to grow corn, and I want to say that I do not come here as knowing all about it or to tell you all about it. I simply wish to impress on you tonight the importance of doing some of the things you already know. Our agricultural improvement is coming to the people as nothing new—just as telling you that you need pure food and other things are not new things, but telling them to you impresses their importance upon you.

Prof. Holden has 228,000 farms in Iowa, and he has increased the yield 5,000,000 bushels. We, in Indiana, are simply trying to wake our people up. When I first went to the farmers there, some of the old gray-bearded men said to me, "That's all right for you fellows in Iowa, but we don't want it here. You can run your corn experiments, and do these things there, but our people are too conservative; our people are not as sensational as they are in the west. Joe Wing, here, who does things with alfalfa, he came here and tried to get us to do them, too, but our people went ahead in the old way and forgot all about it."

Indiana had averaged from 35 to 38 bushels per acre, which was not large. La Porte county on the north, and one of the largest we have growing corn, had this year 60,000 acres of land in corn. They had got in some parts an average yield of 38 bushels per acre, and on the hard clay soil they had an average of 32 bushels per acre, and thought they raised their full share. We went up to La Porte county and increased their yield to 50 or 60 bushels per acre, and then they said they were making money, and they saw their land increasing in value, and they were satisfied.

But we wanted to raise the yield in that county, so we decided to get the boys interested. There are several banks in that county, and we went to the bankers, and induced them to offer prizes to the boys to arouse their interest, and the boys undertook the work, and their yield astonished some of those people. Why, one boy had an average of 114 bushels per acre. Then more boys came, and they raised each one acre of corn on the sand hills, and the clay banks, and the marsh lands of La Porte county, and at the meeting on December 14th, 8,416 boys reported. One boy, in low marsh land that was sold two years before at $5 per acre, raised 119 bushels of corn of 70 pounds to the bushel. A boy of 18 demonstrated to the people of La Porte county something that they had never attempted before. The president of the school district gave a sworn statement that the average of those boys was over 84 bushels per acre. Well, we needed more money to continue our experiments, and I went up there one morning, and a man interested in the Legislature took me around in his automobile, and within a few hours we had secured all we needed. It is just a little matter of getting what you want That is all there is about it.

They became interested up there; and then the question came up, "Can we afford to raise beef cattle on $100 of land?" and I have heard farmers say that they could not raise cattle on $100 of land; they needed it all for corn. And once, when I presented this report of La Porte county, one old farmer said, "Could I take care of 40acres of land the same way that boy took care of his one acre?" I said, No, sir; cut it in half, and take care of twenty acres, and instead of 35 bushels an acre, you will have 75. Turn the rest into grass, and in a few years that old farm will be worth more than you ever saw before."

The question is how to get more corn on the same land, and the thing is how to do it. That is what you want answered, and that is what we want to answer. The first thing is, to get the variety of corn that is best suited to the soil and locality. Many of us, through ignorance, have allowed our land to run down to the point where it will not produce corn any more, and others have, through hard work, brought up the standard of corn, but they still lack in production. Now, these men are here, the same as they are in Indiana, and other states, and these are the men we want to help. We want to find out what will most benefit them. Now, how are we going to find this out?

Now then, a few years ago the men at the Experiment Station got together and decided that they would try to get the corn that averaged the largest yield, and then teach the farmers of the state that this was the corn for them to plant. So these Experiment Station men—I was one of them—sent to the north and to the south, and to the east and to the west of the state, and procured samples of the different varieties of corn grown there, and we planted them in nice little plots, and awaited results. The southern part produced 60 bushels per acre, the north 30, the east 40, another 50, and so on. Then we published these results and sent them over the state, and told them "now you know." Well, they tried it; and the corn grew; in fact, I think it would be growing yet if the frost had not stopped it. But it did not ripen and develop, and they had to harvest it when the time came, but it was a miserable lot of corn. You may have read that one year the corn crop of Indiana was a failure, and the corn not up to standard. That was the year. Well, they harvested that corn, and then their troubles began in earnest. The elevator men refused to take that corn; no one would have the stock. Finally they compromised on a lower price, and the corn was shipped away, and one after another of these farmers came to us and said, "We have lost $1,800 or $8,000," as the case might be, "on the corn we shipped out last year, and the only reason for it was that that corn was not fit to be shipped," and they blamed the Experiment Station—as they had a right to do. One old fellow said the reason was that those fellows up at Purdue had taken the corn away from home, and tried to get results on different soils, consequently the results they offered were not accurate and had no value, and he was right.

So the last two years we have had a man at work in each section, growing corn. I want to speak of this, because it is of value to the people of Pennsylvania. The best way to obtain results, and determine what is needful for that particular soil is by Experiment Station right in your own county. For instance, for the farmers of Lancaster county, a station right there in Lancaster county, doing the work there on that particular soil, and awaiting results. Well, this is the way we did it in Indiana.

We have in every county a poor farm, which has never produced anything for anybody, and nobody expected it to do so; in fact, people usually forgot all about it until they came to pay their taxes, and then they grumbled a little at it. So we went to the authorities and got permission to use these poor farms for our work, and then we went to the farmers and asked them to co-operate with us, and in Randolph and Clinton counties, where we carried on this work, we had about a hundred of them interested. In Randolph county, on the 10th day of May, over 20 farmers gathered together, and each one had a sample of the corn he was going to plant that year. Then they each took a plot, and planted it under the instructions of our Experiment Station, and they got results that surprised them. They ran from 47 up to 90 bushels per acre, and I sat down and figured it out for them; by planting No. 1, which averaged 90.3 per acre, the farmer would, on 40 acres, have just $1,900 more than he ever had before. That particular variety would produce the largest yield on that particular soil.

You can do the same thing in Pennsylvania. Take the man in your neighborhood who gets the largest average, and instead of sending out to Indiana or somewhere else for some of this red-letter corn that is being grown there, and which will probably not produce one-half as much on your soil, owing to the difference in soil and climate, go to the farmer in your neighborhood who is getting the best results, and get some seed from him and plant that, and see whether you will not obtain the same results in dollars and cents.

I want to say right here now that I think Pennsylvania is ready for improvement in corn, and I would like to get your young men interested. The farmers of Pennsylvania have not figured out exactly the best variety in corn farming. Now, in Ohio, and Indiana, and Iowa, we have Corn Growers' Associations, and they have figured out for the farmer that this is the best variety for him to plant. They have figured out that an ear of corn about 10 inches long, and 7½ inches in circumference is the best sized ear. It will have less cob, and more rows of corn well filled out. Our men, three or four years ago, began to point out to the farmers the difference in the size of the ear of corn. We have found out that an ear of this size will fill up the wagon to better advantage It will have more rows, and be better filled out all around than the longer ear. We had quite a time convincing these farmers, but we kept at it until we did convince them. I believe that in Pennsylvania you can grow any kind of corn you want. I believe you are getting away from things when you begin to mark the difference in corn. Now, take these two specimens, one about 11 inches long, and the other probably one-half larger. Now, when these were weighed up, the smaller cob was practically within three-fourths of the weight of the larger The little one weighed 16.14 pounds of cob to the hundred, and the other one went 20, so you can see that on the larger cob we are getting less corn per cob.

Now, take this cob, 10 inches long, and 7½ inches in circumference, with a straight row from butt to tip, with a straight row evenly filled out to the end, and uniform in size and shape. I would rather have an ear of corn filled out well, than to have it run down well to the end. Here is another ear, which started out very good, but these grains ran along, wedge-shaped to the edge. Now, when you get up to within an inch and a half of the top, you get a very poorly filled out corn, and while it has a few more grains to the end, it has lost 250 on the butt.

Now, I see the one main reason for these different sizes of cobs is that you have in your state no standard. That is, you have never had explained to you, and have no organization which has adopted a standard for an ear of corn. In our state the north is now running about 9 inches, and the south about 10 or 11 inches, and that is giving the best results.

I am unable to discuss the subject fully in the short time I have, but I will say that I think we have come to the place where we think we have the best of the corn situation in Indiana. We have 2,500 plots on farms. We have gone into the country and set the standard at 100 bushels per acre, and as a result we have raised it; in one case the average was 55.1, where it had formerly been 25; in another 46, and so on, all over the state we have succeeded in getting a better standard. We have given them a better variety of corn, but the question is how to raise the standard. Now, we have seedsmen in our state, and I don't know but what you have them in your state; they are usually round. Last winter we needed 300 bushels of corn to apply on our farms, and we went to them and said, "We need this corn," and these seedsmen sent us down the best corn. Then we took the different varieties of corn and laid them out in rows, and marked them one, two, three, and so on. Then we made boxes about 3 feet long and 2 feet wide, and put up little bars inside about 3 inches square, of galvanized wire, and filled these boxes with sand. You can do the same thing, and these boxes can be filled with sand or ground. Then we took from No. 1 five grains, and planted them in one of these little squares, putting in a marker "No. 1"; in the next square No. 2, in the same way; and so on. Then we put a cover on the box of a piece of carpet, and kept the box at living room temperature, and at the end of five days you can tell whether the seeds are going to show up good or not. If at the end of the five days it has germinated you will probably get good results from that corn; if not, you had better throw it out. If you don't, you will have trouble.

Here is an ear of sand-hill corn, which is near the desired standard for an ear of corn. Here is another corn produced with more sunshine, and more moisture, but which gives you just about one-third as much as the other. Here is another sand-hill corn, raised in moisture, which produced these nubbins. There is something wrong in the breeding of this corn, and if we could get back to the original stalk we would find the same thing. Here is another, and if, as we are told, corn reproduces itself, this will not produce an ear of corn. Instead we have nothing but barren stalks and tassels. Now, right here in germinating, we can pick out the poor ears and cast them aside If you do this, it will give you in return dollars and cents.

Now, as I said, there are many other things here that it would be well to talk about, but the hour is growing late, and a few questions may be in order. If any of you people have any questions, I will try to answer them this evening, but you will find, if you ask them, that I don't know all about it.

A Member: How far apart do you plant your corn, and how many grains do you put in hill?

Prof. Christie: About 3 feet apart, and about two or two and one-half stalks to the hill.

A Member: At what depth do you put in the corn?

Prof. Christie: That depends upon the season. Early in the season we plant it about 2½ inches deep; later we plant deeper. Down in the White River bottoms, we are

now making our furrows and planting the corn right in it, something on the same plan as is followed on the Mississippi River bottoms.

A Member: The trouble with me is that we don't plant the corn deep enough in that way.

Prof. Christie: If there is a good subsoil, the furrowing can be held down, but where there is a bad quality of sub-soil, it can't be furrowed.

A Member: What is your method of cultivating?

Prof. Christie: Just as soon as we get it planted, and about two weeks afterwards, we use the harrow. Some people talk of putting on the weeder, but as one old farmer said to me last fall, "If you have nothing else to do, the weeder is a mighty good thing, but if you have plenty to do you had better get a harrow."

A Member: Before the corn comes up?

Prof. Christie: Yes; before the corn comes up high enough to grow.

A Member: Do you keep on working it if there is grass on the ground?

Prof. Christie: We try to break it up with the weeder, after which we work it. We usually sterilize the ground for three or four days The best time to get rid of a weed is just when it starts. If you let a weed grow for a few days, it will begin to germinate. If you break it up right off, it is best. We generally go over it several times before the corn is up, and once or twice afterwards.

Mr. Fenstermaker: Is planting in rows with single kernels just as good as furrows?

Prof. Christie: Just as good; I think the former is really the handier. The general rule in our state is that where a man starts his ground well, he can use the check rower. If he has a fluke on his land, he must harrow it down first and then use the roll.

A Member: What is your opinion of kiln-drying corn?

Prof. Christie: It is a very dangerous practice in amateur hands I know of one case in Iowa where a man fixed up a fine room, put a stove in it, and built a little fire, and spread out his corn to dry. A couple of days afterwards he was called to Chicago, and he said to his man, "If this weather keeps on, keep a little fire." After he went away, his man thought if a little fire is good, more is better, and when the man came home, his corn was beginning to germinate, and he lost a thousand bushels of corn. Now, we have a man in Indiana who puts up a large corn crib, and spreads his corn on racks, and covers it lightly, and keeps it at a dry temperature, and he has excellent success with it. If we can get a sufficiently good and dry heat it is all right; if not, it is all wrong.

A Member: How high should the temperature be?

Prof. Christie: If I could keep it dry, I would not be afraid of any temperature. It must, however, be kept down to about 60, I suppose, but a higher temperature would not hurt it unless it got too high. We can get corn so dry as to practically destroy its germinating power, and when it is put in the soil, the soil has hard work to liberate its life giving powers.

A Member: It is quite a common practice in Chester county to put it in cribs and select it from it.

Prof. Christie: For the average man it is bad practice. In the first place, he does not know anything about his corn. You know corn will always reproduce itself, and if you plant the seed of a barren stalk, even under favorable circumstances it is likely to be barren. It is safer and wiser to select your seed corn carefully and test it before planting in the manner I have described.

A Member: Do you use the entire ear for seed?

Prof. Christie: No; the entire ear cannot be used satisfactorily. It could be used if it could be handled, but where we use the planter, we cannot get it distributed properly. There have been some experiments made by investigators which seem to prove, too, that the top grains will not produce as many bushels as seeds from the body of the cob. There is some reason for this, but I am not prepared to give it. My main reason is that we have no planter made that will plant the entire ear.

A Member: Do you recognize any effect from self-fertilization?

Prof. Christie: Not in the average ear, we do not find that they suffer from self-fertilization. The trouble from self-fertilization is very small. The trouble is more with non-fertilization. We do not regard that as very important; the average seedsman should not have any trouble with it.

A Member: Has the barren stalk been entiely eliminated?

Prof. Christie: No; don't get that into your head That is more or less produced by locality. You can take the corn from Illinois here, and have many more barren stalks than on the farm where it was raised. The barren stock is pretty hard to weed out. In our experimental work we have reduced it from 20 per cent to 9 per cent. It can be kept down, but not estimated.

A Member: What is the cause of smut?

Prof. Christie: It is a disease: it starts on the stalk, and then passes down to the stubble that lies on the ground all winter, and in the spring there are millions of microbes ready to start work, and they spread through the air, and grow very rapidly. The way to handle it has not been solved. One farmer will clean his fields, but his neighbor right across the way may neglect to do so, and it spreads across again. If we could get everybody to gather it up and burn it as rapidly as it appears, we could probably soon bring it within control.

Prof. Fuller: Mr. Christie, in addition to increasing the yield per acre, have you given any attention to increasing the protein or the starch?

Prof Christie: We have been working for four years on increasing the yield, and I am afraid we have thought less about the protein than we should. In fact, we have less protein now than we had before. We find the alfalfa and red clover so much richer in protein, that we have confined our attention altogether to increasing the yield.

A Member: What do you know about corn blight?

Prof. Christie: I don't know anything about it.

A Member: Is there any difference in the protein in the white and yellow corn?

Prof. Christie: The result of several hundred tests at our Experiment Station is about the same. This question of the food value of white corn being better than the yellow, or the yellow being better than the white, is to be taken approximately. The only way I can solve it is palatability. For instance, we take dried chips or shingles, but we like them, and we thrive on them; then we take them to a chemist, and he tells us there is nothing in them. Now, here we have a corn that is hard and flinty, and the cattle do not like it because it is so hard on the mouth, and we come to the conclusion that it has more protein in it, when, as a matter of fact, it is just the other way.

The hour is growing late, and if you have nothing further, I thank you for your attention. I assure you that it is quite a long time since I have talked to people after nine o'clock. You must have been interested, or you must have stayed out of courtesy. Either way, I thank you

Prof. Van Norman: Mr. Smarzo, the scorer of butter, is still here, and if any of you wish to see him, you can do so afterwards on the outside. We will now read the prizes awarded to the corn, and afterwards auction it off.

Mr. Bayard: The following is a list of the corn prizes:

**100 Day.**

| Prize. | No. | Name. |
|---|---|---|
| 1st | 4 | Harry C. Trexler, Allentown. |
| 2nd | 6 | Wm N. Lynch, Eliotville. |
| 3rd | 5 | G. A. Trimmer, Mechanicsburg. |
| 4th | 1 | J. F. Lantz, Wyebrook. |
| 5th | 2 | Ralph McCullough, Brookville. |
| 6th | 3 | G. W. Tilton, Claysville. |
| 7th | 7 | Walter E. Stiger, Hepburnville. |

**Flint.**

| Prize. | No. | Name. |
|---|---|---|
| 1st | 3 | W. H. Nunn, Muncy. |
| 2nd | 8 | John A. Ayers, Gillette. |
| 3rd | 7 | F. O. Van Nest, Liberty Corn's. |
| 4th | 1 | M. W. Force, Brooklyn. |
| 5th | 6 | Harry Rockwell, Canton. |
| 6th | 5 | M. W. Force, Brooklyn. |
| 7th | 4 | S. O. Jones, Athens. |
| 8th | 5 | S. O. Jones, Athens. |
| 9th | 9 | A. T. Holman, Millerstown. |

**Yellow.**

| Prize | No. | Name Dent |
|---|---|---|
| 1st | 31 | J. H. Brinton, Gap P. O. |
| 2nd | 8 | Lee R. Scott, Burgettstown. |
| 3rd | 21 | Not identified. |
| 4th | 25 | Pusey Cloud, Kennett Square. |
| 5th | 12 | G. F. Erdley, Lewisburg. |
| 6th | 6 | Jacob Billon, Newport. |
| 7th | 50 | H. S. Harrison, Canonsburg. |
| 8th | 40 | Not identified. |
| 9th | 26 | John L. Bashore, Mechanicsb'g. |
| 10th | 1 | Wm. M. Harrison, Philadelphia. |
| 11th | 47 | Samuel McCreary, Volant. |
| 12th | 22 | J. P. Dentler, Turbotville. |

**White.**

| Prize. | No. | Name. |
|---|---|---|
| 1st | 7 | L. W. Kintigh, Westmorel'd Co. |
| 2nd | 9 | G. A. Trimmer, Mechanicsburg. |
| 3rd | 3 | W. M. Thompson, Uniontown. |
| 4th | 26 | R. W. Anderson, Fawngrove. |
| 5th | 22 | H. W. Anderson, Stewartstown. |
| 6th | 20 | Mrs. S. B. Fritz, Duncannon. |
| 7th | 10 | Not identified. |
| 8th | 21 | Nelson Poorbaugh, Mt. Pleasant. |
| 9th | 31 | B. C. Mitchell, Brandamore. |
| 10th | 29 | Sam'l H. Broomall, Cochranville. |
| 11th | 32 | John A. Heckman, Williamson. |
| 12th | 8 | Jos. C. McCann, Fredonia. |

Mr. Bayard: The corn will now be auctioned off; I hope you have come prepared to bid high figures for it.

After the corn had been disposed of, the meeting adjourned until Friday morning.

Friday Morning, Jan. 25th, 1907.

The meeting came to order at 9 o'clock, with Prof. Van Norman in the chair.

Prof. Van Norman: The remainder of the meeting will please come to order, and we will proceed with the business on hand. The Dairy Union has some business to dispose of, after which the stock breeders will be ready to go on with their work.

Mr. Norton: I have the following report to offer for the Committee on Nominations:

## OFFICERS OF THE DAIRY UNION

President, H. E. Van Norman, State College; Vice President, G. M. Carpenter, Wilkes Barre; Secretary, W. E. Perham, Niagara; Treasurer, M. E. Reeder, Muncy. Directors, J. H. Reichert, Scranton; M. P. Shoemaker, Greensburg; E. E. Jones, Harford; Lewis Stenson, Coatesville; Henry Palmer, Avondale; L. D. May, Granville.

This report is endorsed by the three members of the committee, W. C. Norton, G. C. Watson and John Sharpless.

On motion, duly seconded, this report was accepted.

Mr. Norton: I don't know whether it would not be well to do this in a little different form. I think it would be better for the motion to be offered that the report of the Committee be accepted, and the Secretary cast the vote.

Secretary Critchfield: I make that motion.

Seconded, and carried.

The Secretary casts the vote for the officers, and directors, as instructed.

Prof. Van Norman: I was instructed yesterday to appoint a Committee to confer with the Governor relative to Dr. Pearson. I will appoint these members: Messrs. J. H. Reichert, W. G. Powell, J. F. Lantz, E. S. Bayard and M. P. Shoemaker.

Is the Resolution Committee ready to report? This is to be a joint report of the Dairy Union and the Live Stock Breeders' Association. This Committee has worked together, and will report their conclusions together.

### Report of the Committee on Resolutions.

The joint Legislative Committees of the Pennsylvania Dairy Union and the Pennsylvania Live Stock Breeders' Association report that we recommend the adoption of the following Resolutions:

Resolved, We recommend that the trolley lines be given the right to carry freight, without any limitation as to the kind or quantity, subject, however, to municipal regulation within borough, town or city limits, and we further recommend that they be given the limited right of eminent domain, as follows: Whenever the right of way has been secured from eighty per cent of the property holders, then the balance of the right of way may be taken by the right of eminent domain.

Resolved, In townships where road tax is paid we recommend that the 15 per cent paid by the state be increased to an amount not to exceed 50 per cent.

Resolved, That we recommend the passage "An Act to establish a State Fair Commission to provide for holding an annual State Fair, and making an appropriation therefor."

Resolved, That the Dairy Union and Live Stock Breeders' Association view with approval the development of the Pennsylvania State College along agricultural lines, and the evidence of the adoption of the policy on the part of the trustees of that institution, for the promotion and extension of agriculture and dairy education to a greater extent than heretofore.

Resolved, That since the protection of animals from disease, and the development of the veterinary science are of vital moment to the agriculture of the state, and the health of the people, we deem it important that the Veterinary School of the University of Pennsylvania shall be developed so that it may be adequate to meet the requirements of the Commonwealth in relation to veterinary education.

Resolved, That we recommend that the legislature make liberal appropriations for the further building up and support of these institutions.

Whereas, It is evident that the health of cattle has a very important bearing on the wholesomeness of the milk supply and that general questions of stable hygiene are of weight in this connection and must be considered and satisfactorily handled if this inspection is to have the sanitary and market results that may fairly be expected, be it, Resolved, That in any plan for dairy inspection that may be formulated, there should be incorporated some project for effective co-operation with the State Veterinary service

Resolved, That in any general comprehensive law providing for dairy inspection and control, there should be provision for the definition and protection of such terms applied to milk as Certified, Pasteurized, Sanitary, Nursery, Pediactric, Absolutely Pure, Veterinary inspected, etc., etc., or in general, that milk shall not be misrepresented by false labels or false branding.

Whereas, It is a common practice in some sections of the state to purchase milk by dry measure, and sell by liquid measure, which is an injustice to both consumer and producer, be it,

Resolved, That it is recommended by this joint meeting that legislation be enacted providing that the standard liquid gallon of 231 cubic inches shall be the legal basis for the purchase and sale of milk and cream.

Whereas, The farmers and dairymen of Pennsylvania were largely instrumental in securing the enactment of the beneficial dairy legislation now in force; therefore, be it,

Resolved, That the members of the Pennsylvania State Dairy Union are strongly opposed to any change, amendment or repeal of the Acts of the Assembly, regulating the manufacture and sale of Oleomargarine, approved May 29, 1901, and the act regulating the manufacture and sale of renovated butter in Pennsylvania, approved July 10, 1901, respectively.

Whereas, It is a common practice when cream is purchased on the basis of its fat content, to measure with a pipe the sample used in determining its fat content, and

Whereas, This gives incorrect results, and injustice to one or both parties concerned in the purchase; therefore, be it,

Resolved, That the Pennsylvania Live Stock Breeders' Association, and the Pennsylvania Dairy Union do recommend the introduction of a bill in the present session of the Legislature, making the weighing of the sample of the cream compulsory.

Resolved, That the Pennsylvania Dairy Union notes with satisfaction the increased attention given to dairying by the United States Department of Agriculture.

Resolved, That we believe that the great dairy interest of the nation are of sufficient importance to be represented by a Bureau of the United States Department of Agriculture, and we respectfully urge Congress to raise the rank of the Dairy Division to that of a Bureau.

Resolved, That copies of these Resolutions be mailed to the Hon James Wilson, Secretary of Agriculture, and to the members of the Committees on Agriculture of both houses of Congress

Signed by the members of the Committee on Resolutions, Messrs. Reichert, Shoemaker, Palmer, Comfort and Leonard.

Mr. Bayard: I would like to add one Resolution to that list, and that is in regard to the stallion law Wisconsin has found so satisfactory; I will read it:

"Resolved, That the Dairy Union and the Live Stock Breeders' Association endorse a stallion law similar to that of Wisconsin." This law to be introduced in the Legislature.

On motion, duly seconded, it was agreed to add this resolution to the list presented by the Committee.

Prof. Van Norman: Will you act on these Resolutions as a whole, or in part?

Mr. Norton: I move that they be adopted as a whole.

Mr. Bayard: I would like to hear a list of the Resolutions.

Mr. Norton: Will the Chairman please read the subjects?

Prof. Van Norman reads the first section, relating to trolley freight lines, and the granting of the right of eminent domain to trolleys.

Mr. Bayard: I move that the first resolution be adopted.

Mr Powell: I favor the adoption of that Resolution, but if that were put in the platform of the Republican party there would probably be some opposition, on account of the opposition to railroads. Now, we do not deny the same right to the trolley that the railroad has, but just as soon as they have the right of eminent domain, they will run right through the fields, without any regard to the people. Now, the trolley car is just as dangerous as the steam car, and I think it would be well to insert a provision that the rights of the people be cared for.

Prof. Van Norman: Will they not be taken care of by law?

Mr. Powell: Yes; but why not put it in the Resolution? We are doing everything for the trolley, and nothing for the people, and we should do something in the interest of the people.

Mr. Bayard: How would you get them off the road without giving them the right of eminent domain?

Prof. Van Norman: The Resolution provides that the trolley cars shall be given the right of eminent domain only with the consent of 80 per cent of the property holders.

Mr. Powell: In a few years there will be as much opposition to trolley lines as there is now desire for them. At present the railroads have a monopoly of the freight, but it will not be long before the trolley line freights are controlled by the moneyed interests, and I think we should consider the interests of the people, as well as of the trolley. I am favorable to all these things —railroads, trolley lines, telephones—but I think we should protect the people, too.

Mr. McSparran: It seems to me very difficult to exactly define the rights of the people in this matter. Under the common law the rights of the people are well taken care of, and when they are imposed on by any corporation, they have redress in the courts.

Secretary Critchfield: I only want to say that the rights of the people are cared for by the local courts. If the rights of the people are infringed upon they can go into the courts, and there it is decided what damages they have received, and what they shall be given for them.

Prof. Van Norman: Are you ready for the question?

There being no opposing votes, the Resolution was endorsed as read.

Prof. Van Norman reads the second section, relating to the payment of road tax by townships.

Mr. Norton: I think we had better cut out that word "exceed." I move that it be so amended, and we cut that word out.

A Member of the Committee on Resolutions: There is a special object in putting in that word. We are demanding 50 per cent, nothing less, and it is a question if it can be passed if we want 50 per cent of our road tax paid by the state. I, myself, rather question whether it is wise to use the word, but we don't want to reduce it.

Mr. Norton: I don't take it that we do reduce it. The taxation in our township will be just the same as it was before. If the township rate is $2,000, the state gives you $1,000. This law is not to reduce this $2,000, but it is to add this $1,000. Mr. McLane has the bill in charge, and his idea is not to reduce your home tax, but to add this to it. His bill calls for a flat 50 per cent, and, therefore, I think it should be endorsed.

A Member of the Resolution Committee: Our township this year raised $8,000; then you say that should stand at $8,000?

Mr. Norton: Yes, sir; I was a member of the house, and know the intention of the members having the bill in charge.

A Member of the Resolution Committee: Is it not a fact that there is so much money in the state that they hardly know what to do with it? Why not give the townships some of it, and reduce the taxation?

Mr. Powell: There is danger in that resolution. One township will raise $5,000, and another $1,500, and now the idea is that each gets 50 per cent of it. That should be knocked out where we say that they shall have 50 per cent of what each township raises, because some townships raise so much more than others.

Mr Norton: I am a supervisor in our township, and I know how our township feels, and I would say that we should endorse it as it reads, but I feel that it will hamper Mr. McLane, of Crawford, who has the billi n charge if you leave that word in.

Mr. Bayard: There is no objection to Mr. McLane's bill, and I move that we substitute that bill for this resolution.

A Member of the Resolution Committee: I don't know anything about that bill, and I would not be in favor of endorsing any bill that is not brought regularly before this body.

Mr Norton: This bill comes up before a body of 20 men before it reaches the house, and if a bill comes on the floor of our house endorsed by 20 men, I think we can safely endorse it. If the bill were not a good one, it would not receive the endorsement of these 20 men. We have never had as good a Road Committee as we have had this year. This bill will call for the addition of 50 per cent to what each township raises.

A Member of the Legislative Committee: I suppose that the legislature cuts out some of the bills that they do not want any special discussion on?

Mr. Norton: Well, yes; but no recommendation that carries with it an appropriation.

On a vote being called for, it was finally agreed to endorse the bill as read.

The remaining sections, on being read one by one, developed no discussion, and were passed in the order named by motion regularly made and seconded.

Prof. Van Norman: That is all the resolutions, and if there is no further business, the President of the Breeders Association will take the chair.

Whereupon Mr. Norton takes the chair, and the business of the Live Stock Breeders' Association is taken up.

President Norton: Is the Committe on Nominations ready to report?

Mr. Powell: I would say that this Committee has decided, after consulting with many of the members, to let well enough alone. We therefore, make the following nominations of the old officers:

President, Hon. W. C. Norton, Waymart; First Vice President, Dr. Leonard Pearson, Philadelphia; Second Vice President, M. P. Shoemaker, Greensburg; Secretary, E. S. Bayard, Pittsburg; Treasurer, J. F. Lantz, Wyebrooke.

**Executive Committee:** W. G. Powell, Shadeland; W. N. Clark, Claridge; D. Norman App, Selinsgrove; Lee R. Scott, Burgettstown; George C. Watson, State College; James Blair, Hartstown.

**Legislative Committee: Hon.** W. C. Norton, Waymart; E. S. Bayard, Pittsburgh; Dr. Leonard Pearson, Philadelphia; Dr. Thomas Turnbull, Allegheny; H. W. Comfort, Falsington; R. L. Munce, Canonsburg; J. H. Relichert, Scranton; S. E. Nivin, Landenburg; Henry Palmer, Avondale.

**Transportation Committee:** Thomas E. Orr, Beaver; Dr. J. Cheston Morris, Philadelphia; W. F. Shrum, Adamsburg; Jas. T. Fleming, Belleville; J. Grier Dain, Malvern.

**Committee on Fairs:** W. C. Black, Mercer; James Blair, Hartstown; J. L. Henderson, Washington; J. D. Detrich, Flourtown; L. D. May, Granville Centre; W. E. Perham, Niagara; J. D. Nevius, 344 Mint Arcade, Philadelphia.

On motion, duly seconded and carried, the report of the Committee on Nominations was accepted.

Mr. McSparran: I move that the President of the Dairy Union cast the vote for these officers.

Motion seconded and carried.

Prof. Van Norman thereupon casts the vote for the officers as named by the Committee on Nominations.

Prof. Van Norman: Is the Auditing Committee of the Dairy Union present? If not, I might say that we are in a hole about thirty dollars.

A Member of the Auditing Committee: We are behind $40.73.

Prof. Van Norman: Will you accept this informal report?

On motion, seconded and carried this informal report was accepted.

President Norton: Is there any one in the room that has anything to present to the Convention?

Mr. McSparran: It seems to me a shame that our Treasurer should be expected to do the work and pay his own postage. The Secretary, being a newspaper man, it does not matter so much, but Mr. Lantz spends a great deal of his time in attending to matters pertaining to the Association, and I think he should receive some remuneration.

President Norton: There was a balance of $64 in the Treasury last year, but this year the bills are not in yet, and we don't know where we stand. I would say that I feel as Mr. McSparran has expressed it. that Mr. Lantz should have some remuneration, but I don't see how we can afford it. From the time that we organized in Pittsburg, eight years ago, we have received barely

sufficient to meet expenses, and we have been working for the good of the cause. I know that whatever Mr. Lantz does, is done cheerfully, and that he feel with us that it is for the common good.

Gentlemen, I thank you for re-electing me to the Presidency, and I trust we shall continue to work together to better our organization.

If there is no further business, the meeting stands adjourned.

## THE CORN SHOW

### THE CORN SHOW.

The corn show brought out by prizes offered was a highly creditable one for the first exhibit. The inexperience of the management led to some errors in the conditions and directions given exhibitors, this, no doubt, being responsible for the fact that some of them omitted all marks of identification from their corn. Every effort was made to identify these exhibits and usually with success, but a few could not be identified either from the letters of transmissal or from the packages. We much regret this and must plead our inexperience in such matters. The corn was duly numbered and arranged on tables for exhibition and all marks of ownership removed, so that the judge might have numbers only before him.

It was found that the entries in the regular classes numbered: Yellow Dent, 60; White (and White-Capped) Dent, 32; 100 Day, 7; Flint, 9; a total of 108. Besides there were a number of entries of corn not provided for in the classes, such as pop corn, red corn, sweet corn, and extra samples submitted by those who made only one entry in competition. The total reached about 125 exhibits of ten ears each and included many different types and varieties.

The corn was judged by Prof. G. I. Christie, of the Indiana Experiment Station, whose awards were as given elsewhere. The prize corn was auctioned off and what was not wanted by bidders was sold to grain dealers, as all the corn exhibited became the property of the Association.

See awards on page 42.

## THE ALFALFA SHOW

Only a few samples of alfalfa were submitted, the competitors being Lee R. Scott, Washington county; T. Maxwell, Westmoreland county, and W. A. McCoy, Mercer county. The prizes were awarded in the order named by Joseph E. Wing, the alfalfa apostle of the east. Letters from the winners appear below, giving their experience in growing the crop.

### Statement of W. A. McCoy.

Dear Sir:—I will write you a short description of my experience with alfalfa. In the spring of 1889 I brought a peck of seed from Canada and sowed it with oats on gravelly ground, which was rather poor and I never saw but one stalk. In 1894 we sowed a small piece which had been in corn the year before. We sowed it on gravelly ground without any nurse crop and without any manure or lime. It came up thin and grew slowly for a year or two and the chickens ate it out.

In the spring of 1900 we sowed one peck of seed in the orchard where it was shaded, the ground had been manured and covered with wood ashes the year before and planted in beets and carrots which were well worked and kept free of weeds, then in the spring of 1900 the ground was plowed the last of May without any manure or lime and seeded to oats and alfalfa. The oats were cut at the usual time and nothing done to the alfalfa until the next year, when it was mowed twice and twice each year until in 1905, when it was mowed three times and three times in 1906. The first cutting of 1906 was on June 28th, the second on August 16th, and the third on October 10th. It is not a good stand all over the patch, but is getting thicker every year and the best of it will make about one ton to the acre.

The spring of 1906 we sowed two acres of a piece of ground which we had worked in roots for about four years. The ground was a sandy loam, had been well manured and kept free of weeds and was plowed on the 5th of May and harrowed every week until the last of June, when we had it very fine. We then put on 30 bushels of stone lime to the acre and harrowed it again and dragged it. Then we got 10 bushels of soil from the old patch and scattered over this to try the effects of inoculation on it. Then we sowed 21 pounds of good seed on it with a wheelbarrow seeder, one-half sowed one way and one-half the other way. Then we harrowed it with a smoothing harrow and dragged it with a plank drag. It came up very quickly and evenly, but the weeds grew faster than the alfalfa so we mowed it the first of July and again in August and September.

By this time the alfalfa was growing nicely, so we left the fall grass and other weeds grow until the frost came and they make a nice covering for the alfalfa, and I have never seen a nicer stand of any kind of clover. It is thick and strong and even and I think can be cut three times next year.

The field we had in corn in 1906 is very gravelly and part of it was manured last spring before we put it in corn. We will plow it in the spring and top-dress what was not manured last year, then spread about 30 bushels of stone lime to the acre, then inoculate it with soil from the old patch. We will sow two bushels of oats and about 20 lbs. of alfalfa to the acre and see what it will do.

I think we can grow alfalfa in Mercer county as well as anywhere if we thoroughly cultivate and manure and lime our land.

### Statement of T. Maxwell.

If I live another year I will load up for the alfalfa contest. I am going to sow three acres more. I can't do without it. My cows won't eat timothy hay any more. Have a good silo and the alfalfa hay stretches the hide on the cows. Twelve years ago I got the alfalfa in my head. At that time we had no writings on it, no speakers on it. I sowed a bushel on my wheat in the spring. Of course it was a failure, but I learned. Some little came around the corners of the field and sides where there was no wheat. There are some fine plants, grew large. I saw it would grow. My next attempt was four years later. I sowed a bushel on four acres of oats, rolled the oats, sowed the seed, gave it one stroke of the harrow. Oats and alfalfa came up fine. When the oats came in head the alfalfa was six and eight inches high. I thought I was too poor to cut the oats for hay, but by the time the oats was ripe the alfalfa was yellow. Oats threshed 62 bushels to the acre and the alfalfa was gone. The next I sowed it as a crop, plowed, disked, harrowed, rolled and sowed, one stroke of harrow. That was the time I struck oil. Last fall if it had not been so wet I would have had a fine fourth crop. I have only a small farm, 40 acres, handy to Valley Camp on the Glade road. I haul the Kittanning express on B. and A. V. R. R.

T. Maxwell.

## ADDRESS OF PROF. VAN NORMAN, PRESIDENT OF THE DAIRY UNION

The president's address is often looked upon as a necessary evil, and it may be so. I want, in my remarks this afternoon, to call the attention of the dairy interests—and when I say "dairy interests" I mean that use of the term which includes butter making, milk shipping, cheese making, breeders of dairy cattle, in fact all the dairy interests of the state—to the possibility that stands before us.

The Dairy Union has seen the milk shipping business of this state very largely increased; at the same time, there is an increased demand for more of the best butter, and to the dairymen who are making the butter, I want to say that if they would increase their product and get a good price for it, there are three things to be taken into consideration: First, that you make a good article; second, that you make it good from day to day, uniformity is one of the greatest factors in success; and, thirdly, that you have good facilities to get the same to market. I have been impressed with the demand there is for a good article. The consumer asks, "Where can we get good butter?" and "Where can we get good cream?" The ice cream people are going further and further from the large cities to get their cream, and in the smaller towns there is an increasing demand for good ice cream and for good cream. There is more and more ice cream being used, and what used to be a luxury has become a necessity, and every housewife is appreciating, as she should, the value of good ice cream as a dessert.

The demand for cream for ice cream raises the question whether that is the best way to dispose of our milk. It is, if we use the skim milk wisely. If you do, it usually makes the highest priced market we have for the cream. I would ask you, therefore, to consider that in the sale of cream for ice cream there is a marked growth and a growth that will continue for some time.

Our city consumers are losing faith in the integrity of their milk men in a great many cases, and they want somebody to certify whether they are getting a good clean milk, and there is, consequently, an increased demand for certified milk. But we will hear more about that later in the evening, so I will simply call your attention to it, that at the present time the public wants more milk that is pure, and clean, and free from the bacteria of filth and disease. I tell you, that the city people, with their babies to be fed on the bottle, find it a very serious problem to secure good milk. An important question to the father and mother is to get a milk that can be fed to growing children with safety, and it is worth our while to let them know that we have such an article to offer them, and to get their orders. I think there should be a difference in price between a good article, and an inferior article. In many cases the milkman with a good article is getting as much as it is worth. I think our consumers should refuse to pay so much for the poor milk, and pay more for the good. This will make the milkmen discriminate. This question of raising the quality, and getting the consumer interested in it, is one of the problems of the milkmen. The only way to do that is to produce a good article, and then insist upon having a good price for it.

Now, a word to our breeders of dairy cattle. I am glad we are here with the Breeders' Association, I wish my colleagues in the dairy work would heed the teachings of the Breeders' Association regarding pure bred stock. I want to impress upon these men that one of the most important means of raising the standard of our dairy cattle is by getting pure bred sires into the common dairy herds. Many years ago our breeders of beef cattle had an over supply of registered beef bred bulls. Some enterprising man took a lot of them to the range and from them has developed a class of steers that is today ahead of those in many of our older states and created a market for thousands of registered beef bred bulls. Why? Because they have had pure bred sires for several generations and their offspring show the influence. If you go into our large packing houses today you will see many animals that show the marks of the pure blood of the beef breeds. If our common dairy herds can be improved by putting in pure bred sires, then the owners of registered dairy cattle should be among the first to encourage the pure bred sires.

We want the largest amount of milk for a given amount of feed. The average now produced in this state is 150 to 160 pounds of butter fat per cow per year. The average in our college herd for the last six years, running from 22 to 32 cows per year, is 270 pounds per cow. We do not have pure bred cows, but for 10 or 12 years the college has used the best pure bred sire they could get. Some times they have been hindered by lack of money; sometimes because they could not get what they wanted, but they have always used the best sires they could get, and the result is apparent in the yield of fat. I suppose these results could be duplicated on every farm in Pennsylvania, but sometimes we farmers don't know what is good for us until some one comes along and sticks it under our noses. Then we see the advantages of breeding pure bred cattle and of getting the record of what the cows are doing, and of bringing these things to the notice of the farmers. If there is any man who wants help of this kind most, it is the man with scrub cows. When we can get in touch with him, we will be doing just what the man did who went out on the Texas range with his surplus of registered bulls to improve the beef cattle from

the plains. Often you don't know what to do with a bull calf, so you kill him or give him away. If he has a mother that has a good butter fat record, that is the last thing you ought to do. It will pay to raise him, and get more of the pure bred sires into the common herds of the state.

I want to urge upon you the necessity of keeping a record of the butter fat of each cow. You have to keep that cow 365 days in the year. What does she give you for it? I can show you records of men who are not getting a dollar's worth of milk for a dollar's worth of feed, and I have seen cases where they only received 99, or 70, or 80, or 60 cents' worth for a dollar's worth of feed. They have the same kind of feed, and they have the same kind of stock; what they need is a record of what each cow is doing, so as to eliminate those from the herd that are not paying. There is not a man of you but would require of a man five dollars in change for a five dollar bill, yet there are many of you here who are keeping cows that are giving $30 worth of fat in a year in return for $29 to $32 worth of feed, when you might be getting $50 or $60 worth. Keep your records, and then add a little more care in the handling and feeding of that cow, and see what the result will be.

To go back to the Dairy Union a little bit, I have two or three suggestions to submit: I hope the Nominating Committee, in selecting the officers, will bear in mind to select men who will help push along the work, so that it will develop into larger usefulness. The only object of this association is to help the dairy interests of the state. It is by developing the industry as a whole that we help ourselves. You know we are all a little selfish, and what helps the union helps us. One man may not be able to do much, but if each man is willing to do his little part we will have strength and energy enough to carry the great work along. I would like to see another year, two days given up to the discussion of strictly dairy subjects, such as butter tests, pure bred herds, scrub cows, cheese making, butter making, starters, butter scoring, etc., all of which we can use to advantage.

I would like to see a large exhibit. It was with fear and trembling that your officers this year decided to have an exhibition of dairy machinery and of dairy products. The machinery manufacturers responded, and have sent us an exhibit. Now, you want to do your part by showing your interest in them; when you want to buy machinery, buy from them, from the people who have sent their exhibits here.

We are disappointed that there are not more dairy products. We did not get our advertisements out early enough I fear. Next year we will do better. Many who have a market for a medium grade article will not be able to hold it if some one offers their customer a better article at the same price. When the market is flooded it is the man with the best goods who gets the top price.

The milk exhibit will be spoken of by a man who is making the examinations. I would that we might see an exhibit from every creamery.

In our meetings there has been much stress laid on the thought that you cannot make good butter from poor cream. If you have patrons that are delivering good milk and cream send samples of it in to compete at this show.

I want to express my appreciation of the efforts of the Vermont Farm Machine Co. in getting our exhibits from their customers. They offered special prizes to the makers of butter who use their machines, and I believe that the exhibit of butter here is largely due to their efforts. Let us see what we can develop next year in this line.

I would like to call the attention of the farmers to the desirability of forming associations in your neighborhood, for the testing of your cows and securing the records of the cows in your district. Three different creameries have stated that they are willing to pay $100 each to have a man come there at stated periods. say about three times a month, and test the samples of milk. I am not prepared to say today just what I can do, but if eigth or ten creameries got together in this way, the expense on each one would be very slight, and I would get the man and guarantee his work.

Now, just a word regarding the butter. I fear that some of you who are exhibitors here may be disappointed in the scores. I selected the judge, and he has judged it on the basis of the barket requirements. If some of you have a low score, and are getting a top-of-the-market price for it, don't be discouraged, but go ahead and see if you cannot secure a high score and yet please your customers also.

I submit the following recommendations for your consideration:

1. That the Dairy Union should work for the passage of laws that will secure the registration of creaeries, cheese factories and similar establishments, together with sanitary oversight of such places and the farms where products intended for sale are produced.

2. The establishment of a great state fair commensurate with the agricultural interests of this state, the value of the agricultural products being greater each year than the combined value of coal, iron and oil produced annually.

3. A law defining certified milk and providing for the proper use of the term.

4. The securing of such appropriations to the Pennsylvania State College as will enable the Dairy Husbadry Department to have several traveling instructors to assist the cheesemakers, butter makers and milk producers in improving the quality of their products and stopping many of the leaks that now exist, also to gather such information as will enable the department to be of greater use to the dairy interests of the state.

5. That Professor Harry Hayward. who did so much to help forward the work of this Association, be made an honorary member.

6. That Article 3 of our Constitution which now reads, "Any person interested in dairying, whose name is approved by the membership committee may become an active member by subscribing to the Constitution and By-Laws, and by payment of the annual fee of one dollar," be amended so as to read as follows:

"Any person, firm or agricultural organization interested in dairying, may become an active member of the Union for the calendar year upon payment of one dollar, or may become a life member on payment of ten dollars, or after having paid ten annual membership fees.

"Any agricultural organization holding an active or life membership in the Dairy Union may list its members as associate members of the Pennsylvania Dairy Union for the calendar year on payment of 25 cents for each such member, and shall receive as many copies of the annual report and other publications as it has associate members. Associate members shall have all the priviileges of membership except voting and holding office.

"Any person rendering this Union noteworthy service may be elected an honory member by unanimous vote at any regular meeting. Honorary members may not vote or hold office, and shall be exempt from dues."

Now, here is the point, that agricultural societies may list their members as associate members of the Dairy Union. Many societies of this state which are interested in dairying, are not represented here, becaus it is too far for their people to come, or for their Grange, or Farmers' Club, or whatever organization they may have, but by the payment of the small fee of 25 cents they become members, and receive the publications, and their interest is aroused, and the work spreads. I have also provided that any organization may become a life member upon payment of ten dollars.

I think this is enough president's address for one time, so I will now make place for Dr. Dexter, of the Dairy Department at Washington, who represents Chief Webster. Chief Webster is unable to be with us in person. The talk on alfalfa will come later.

## ADDRESS OF DR. WM. HART DEXTER

We are all very sorry, I am sure, that Mr. Webster is not able to be here today. It becomes my privilege to stand in his place. I wish to make your acquaintance on the right basis and to have you understand, in the first place, what the work of the Dairy Division at Washington is. From the very excellent work that is being done with limited means at your own State College, and realizing after the address of yesterday by Dr. Hunt, how much more is needed, I am sure that you are in a position to appreciate the readiness of "Uncle Sam" to assist the varied interests of the different states without interfering with your state rights to do in your own state what your institutions ought to do.

The Dairy Division of the Department of Agriculture at Washington aims to be, and is to a large extent, a clearing house for ideas. It was not primarily an institution for research; it is not intended to do other people's work for them, but it was organized to learn the most successful dairying methods from the different parts of this country and other countries, and to learn also the dairy needs of our own country especially, and to tell the better ways of doing the things that need to be done, so that all the people who need to do these better things could learn how.

During the last year the Dairy Division has doubled its working force and improved its organization, so that now we have the different classes of investigations provided for, as you will see by this leaflet (showing leaflet) outlining our work, and telling you of publications of interest to dairymen, many of which you can have without charge if you ask for them.

You will learn of some of our market milk investigations this evening in connection with the report on the milk and cream that has been sent here. We are making a study of the dairies that supply Washington with milk. There are about 900 of them. About 300 of them have been examined already with the use of a score card which indicates a standard of excellence. This standard is such as can be adopted by any city, and we shall be glad to help any city that wants to try it. Cleveland is already trying it with encouraging results. The plan is such that the producers and dealers can find their records with the Board of Health, and can see there where they fall short and how to increase their rating without materially increasing their expenses. Their attention is called to points which they may have overlooked, or points wherein their workmen have not carried out their instructions.

We would be glad to assist you in the work of inspection which your President has suggested, and if desired would send you a man to go with your inspector as has been suggested, to make the first tests.

We have a butter expert at work here examining the butter, scoring it according to the market value and explaining its defects. He has shown at the creamery session how to determine the amount of water in butter, using the new rapid method and device invented by our Mr. C. E. Gray, which promises to do for butter what the Babcock test does for milk. This is a device patented by the Department of Agriculture for the benefit of the public.

Our cheese experts are at work in Connecticut and Wisconsin with the purpose of ascertaining the best methods of making cheese of the European and American varieties. Swiss cheese is now produced in Wisconsin in almost the same form as in Switzerland. Camembert cheese is successfully made at the Agricultural Experiment Station at Storrs, Conn.

We are also pushing southern dairy investigations under special appropriations by Congress, so as to ascertain the difficulties peculiar to that section and overcome them. Our field agents visit the dairy farmers, manufacturers and dealers, co-operating with them in the introduction of improvements.

We have a building expert at work so that we are able to recommend suitable plans to those who are about to erect dairy buildings, and we sometimes furnish sketches of such plans so that we may learn in return what are the actual benefits of such improvements, and then pass them on to others.

We have our dairy laboratories at Washington, where we are now ready to make such investigations as are necessary to supplement the lines of work carried on at various outside stations.

In co operation with the State College of Missouri, we are conducting investigations of the composition of normal milk as affected by the age, feed, breeding and lactation of the cow, and the nature of her care and surroundings. We want to find out what milk really is, and how it varies naturally.

We are inspecting the manufacture and sale of renovated butter throughout the country, as required by Congress.

The Division now has 46 employes, 31 of whom are scientists, and seven engaged in inspection work. Write us fully and ask us any question that you would like to have us answer, and we will do all that we can from Washington to help you.

May I say a few words of encouragement to the dairymen as to the general advantages which it seems to me are not appreciated as highly as they should be, advantages which belong to the occupation of the farmer, especially of the dairy farmer? I find that young men in a great many places have an entirely false and unworthy notion of what farming really is, what it really affords, for

example, in the way of independence, of opportunities for profit, and for social pleasure and comfort. You, with your broader views, I presume, are already doing missionary work trying to raise the lamentably poor conditions of some of the farms around you, as you see them. Our boys should learn from us the advantages of the dairyman's independence of living as compared with the constant limitation of the freedom of men in other employments. We should show our girls and boys and our neighbors how really less capital is required to start profitably in the business of dairy farming than in almost any other occupation. I wish we might appreciate also the advantages of the dairyman's home, in the fact that all the members of the family can be occupied in some profitable way, without unnecessary hardship, on the dairy farm. I wish we might appreciate the fact, and tell our neighbors how delightful is the work of the dairy farmer; how life in the open air and the interest of being with living things gives health and vitality to body and mind, and makes homes glad. Perhaps we are not in the habit of thinking enough about these things, and we forget to speak often about them to our boys and girls. I wish we might bring it home to them that our occupation really develops the most desirable habits of industry and economy and good morals. I wish we might impress upon them that surroundings most helpful to manhood are found on dairy farms. I wish we could make them see how especially calculated is dairy farming to show that labor is honorable, and that it is worthy of all their best efforts. And, standing here in the State Capitol, I am impressed with the idea of the special opportunity which comes with dairy farming, of honorable participation in political life of the better sort. No occupation offers greater possibilities of political leadership than dairy farming.

Your President has stated the importance of knowing the needs of the dairy. We should make these needs better known through the newspapers. Perhaps some of you noted, as I did, the small importance that seems to be attached by the city press to this meeting. The only indication that I could find in the Harrisburg papers this morning that this convention is being held, was a small item in one of the papers, barely mentioning it, and saying that the program was being followed; yet the Governor was here and presided for an hour! Now, the daily paper has a large share in the instruction of your boys, and I mention this because of the importance of bringing our work properly before the representatives of the press.

I will only urge a few suggestions as to the special advantages for dairying in Pennsylvania, and then I will stop, because I know you are anxious to hear the others who are to speak at this session.

To the dairy farmer there is no more important question than that of the water supply. In this state with its mountain springs and many streams, water is abundant.

I was quite impressed at the creamery session this morning with the fact that your buttermakers seem already to have found sufficient markets for their product. Another advantage is the ease with which the markets near home can be reached.

You have the advantage over men in other forms of agriculture, in that you are turning the rough products which others sell into the finer and more finished products, less bulky and more valuable, so that you are able in selling butter and cream from your farm, to do so at less cost for transportation, and thus, of course, to increase your total profits.

There is another advantage partly discussed yesterday by Prof. Hopkins, in the increased value of the land which comes from dairy farming. I could give you reports from other states, from Germany and from Denmark that go to show this. Where they raise one crop exclusively, such as tobacco or cotton, the farm loses its fertility. Some of the great farms of the west, once producing year after year enormous crops of wheat, have been brought by that system down to a yield of only eight or nine bushels per acre. But now, with dairy farming they are going up again to yields of 30 or 40 bushels, and to largely increased cash values for the land.

I would like to show you the value of the co-operative cow testing associations as developed in Denmark. The average increase in milk production after five years' trial was nearly 1,000 pounds per cow per year. The average increase in butter was 43 pounds per cow per year. I would like to discuss this with you at some length, but I will merely suggest that you join in the plan for co-operative testing as outlined by your President. We will help you from Washington all we can. I will not go into this argument with you, as I understand that Mr. Van Alstyne has already given an excellent talk on this subject; I will simply add an illustration: A little herd of 12 dairy cows up in New Hampshire produced in the course of a year a net profit of $195.86—a small amount—but the profit from the best cow was within 30 cents of the combined profit of the first six cows in the herd. Four of these cows barely paid expenses. The owner of this herd might sell his six poor cows and lose no more profit than if he only sold his best one. So, unless you keep a record of each cow's production, you do not know where your profit comes from or just what you are doing when you buy or sell cows.

We, who know, are under obligations to do better things ourselves, and to raise the average of the farms around us. It is so pitifully low. In an average neighborhood into which one of our men went, he found that the average production of butter of the dairy herds supplying milk to the creamery was about 140 pounds per cow per year. After he went there and worked with them, the herd on which he was employed averaged 280 pounds of butter per year per cow, just twice the previous average of the neighboring herds. You will very likely find similar cases around your own home. Appreciate your opportunities to raise the standard in your community.

It is encouraging to know that a more scientific and reasonable understanding of the advantages of dairying is coming to both men and women. About a year ago I had the pleasure of talking with a woman who is most enthusiastically interested in supplying certified milk to the people of Chicago, having a farm a few miles up the lake, where she maintains sanitary conditions, and sets a fine example to many of the men engaged in supplying milk to the city. I also learn that Philadelphia is receiving a high quality of certified milk, a sample of which will be shown here tomorrow, produced by a successful woman dairy farmer, personally interested in the occupation which she adorns.

Let us go home from this Convention holding our heads high as successful dairy farmers, and while we congratulate ourselves on the advantages we enjoy, let us urge our boys to go to the Agricultural Colleges and learn how to do things scientifically, and when they return with thorough preparation, let us join with them in practical application of the best methods to the advancement of our common interests.

# SOME THINGS IN DAIRY FARMING

## An Address Prepared for the Dairymen's Convention at Harrisburg, Pa., January 21, 1907, by Hon. W. D. Hoard, Fort Atkinson, Wis.

What does it mean to be a dairy farmer of today? This is a very important question to everyone down the long line of men who make up this great dairy industry. There is no man in that line who is as important to the industry, as the farmer back on the farm. On him must rest nearly every important consideration; the quantity of the product, the quality of it, for here he governs completely; the stability of it for if he finds it unprofitable the whole line wavers and is thrown into confusion. It is his honor, conscience, intelligence and watchful care that determines the quality of all the products of the cow. On quality depends consumption, and on consumption depends price and profit. All this depends on the man behind the cow. Then, besides, the character of the cow herself depends on his intelligence. discernment and enterprise.

The dairy farmer is the man at the switch sending the train along the right track or stalling it on a siding.

We have only to think this business of dairying out to its roots and branches to see that all the forces of education, law and public opinion should be enlisted to make the dairy farmer understand his own importance to the whole, and fully and thoroughly understand what it means to be a dairy farmer of today.

In thousands of instances the love of money, larger profit, better reward, is not enough to make thinkers of unthinking men, who keep cows and unprofitably fill the place of a profitable dairy farmer. And so there must be constant agitation of the subject: constant stirring of thought, constant holding of conventions and institutes; constant reading and study, that if possible, these men who keep cows and do not realize what dairying means, may be reached and lifted up until they can see the question in its true light.

Think of the great width of this question. Think of the vast army of men it supports from the farm to the creamery and cheese factory; to the thousands of dealers and commission merchants; to the manufacturers of machinery and dairy supplies; to the great transportation interests on both sea and land that look to it for sustenance. Then think of the millions of consumers who wait upon the cow and all these intermediaries for their daily food. The cow makes it right, pure and good. If there is any thing wrong with it, it comes from the ignorance, indifference and willful neglect of the men who stand between the cow and the consumer. Chief among these is the farmer. He must be held to the largest responsibility for he has the most to do with the milk at the time of its greatest liability to bad impressions. At every stage beyond him modern science has done more to perfect the way than it has at the farm, and this for the reason that farmers, as a class, have not believed in science. They have not taken an educated mental interest in their business. The domain of science is in the mind and farmers have had but little mind for it. Hence, they do not see how it bears upon their work. The greatest problem in agriculture today is to get the farmer to see where science touches him and his life work and so take advantage of what she has to give.

Right here lies the larger meaning of dairy farming. I have spoken thus in a general sense so we may take a larger view for a moment of the great field dairying occupies and the necessity that exists that the dairy farmer should comprehend well his own relation to it. I have selected a few special lines to talk upon that bear most sharply upon the farmer. First of these is the breeding of the right kind of a cow for his work. Do you know that when we come to study into this question, it is absolutely appalling to see what enormous losses the farmers of the country sustain because they will persist in breeding and keeping cows unfit for dairy work.

Hoard's Dairyman has spent $3,000 in taking cow censuses in ten states, from Iowa and Minnesota all the way to New England. In several of these states such as Wisconsin, Ohio and New York, several censuses have been taken. In the main they were of 100 herds each. As accurate study as possible was made of each cow, in each herd, and a statement made of what she earned at the creamery and what she cost in feed.

From this mass of testimony, the best that has ever been attempted, we find that fully one-third of the cows are kept at actual loss.

Think what a drain upon the farmer and the country this is. Is it not time that the men who keep cows tried to obtain a better understanding of what it means to be a dairy farmer?

### The Upward Step.

We are oll affected by our environment. How universally true is the old saying "A man is known by the company he keeps." There is no getting away from the influence of association. Every farmer is subject to it. The books and papers he reads are his associates, just as much as the men he meets. One of the greatest dairymen Wisconsin ever produced was Hiram Smith, of Sheboygan county, who died in 1890 and for whom one of the important buildings on the University Campus, the Hiram Smith Hall, was named. One of his favorite sayings was, "A registered sire is a great educator. It is an upward step." He had seen farmers about him in all stages of development and with no development and he declared that there was no hope of a man's upward progress as a farmer just as long as he kept a grade or scrub sire. Here again do we see the effect of the law of association. We have noted it ourself in hundreds of instances. All about us in Jefferson county, Wisconsin, now noted for its production of dairy cattle, are farmers who have made handsome progress in knowledge and wealth. Their progress dates from the very hour that they commenced keeping a pure-bred sire. A large proportion of them are Germans, who have been obliged to learn to read English in a slow and difficult manner. They saw the improvement that came in their neighbor's cattle from such a sire. That set them to thinking. Buyers came and paid more for the heifers and cows from such sires. The buyers were a different order of men. They talked on an upward grade. Here was another association. One good sire at registered prices succeeded another. That was more association. Their minds began to expand; they could see more in this business of dairy farming. Their farms are selling for $100 to $150 an acre. They sell annually a half million dollars' worth of cattle. Their sons are going ahead, making more intelligent dairy farmers than did the fathers. They are attending the short course at the College of Agriculture. Several of them have branched out into breeding registered cattle. In 20 years there will be hundreds of such breeders in Jefferson county. Who can measure the influence and effect upon a farmer when he commences to associate with pure-bred cattle?

Yes, Hiram Smith was right. "A registered sire is a great educator." Verily, "A man is known by the company he keeps." Scrub cattle will hold a man down to scrub ideas on general farming. There can be no "upward step." The influence is retroactive on both the farmer and his cattle. Better ideas lie at the bottom of all betterment.

There are a hundred copies of dairy and agricultural papers read by our Jefferson county farmers today where there was one 20 years ago. The barns, the fences, the fields of alfalfa, clover and corn, all show an upward trend in thought as well as in the methods they practice. How powerful has been the reflex effect of this law of association. Let us be careful of the company we keep. "Birds of a feather flock together." When a man buys a registered sire he gives notice to the world that he is on an up grade himself in his ideas of cattle. It will not be long before he will think towards improvement in other things.

### Keep the Calves Dry and Clean.

Every human mother, that is fit to be a mother, knows that if her baby is allowed to remain wet and uncleanly, it will soon grow sickly. The bovine baby is strictly amenable to the same law. Every calf raiser must have seen the ill effects of allowing calves to lie in their own voidings and urine. A farmer was once showing us his stock. His horses were bedded down with an abundance of straw. His calves were lying in filth and moisture that made us indignant to behold. "What are you raising those calves for?" we asked. "To make cows of them," he replied. "Oh, no, you are not. You are raising them to be weak sickly failures," was our answer. He confessed to us that he had lost a good many calves, but he never had thought that the way he kept them was the cause.

Turn a calf or a pig out in the woods and it will find for itself a bed of dry leaves in a clean place, and they will keep healthy, if they have food enough.

In my own calf stable every winter are from 25 to 30 calves. Around the outside, next to the wall, is a feeding alley. Then comes a row of stanchions, the only place on the premises where I use a stanchion. Then comes the open ample room with a dirt floor. This is covered every day, and if necessary, twice a day. either with bright dry straw or shavings. This floor is sprinkled night and morning with a good disinfectant. The calves are fed in these stanchions, with skim milk, fresh from the separator, in clean tin pails twice a day. Then they are given a feed of oats or barley meal, followed by alfalfa hay. All this consumes an hour, say. Then they are let out of the stanchions to run at will on the floor. Twice a day they are let out in the big barn yard to have a run and play. Fresh water is kept standing before them, on the floor of the stable, all the time.

Now this care takes a little time and thought. But you can never have skill and good judgment, nor the rewards of skill and judgment, unless you invest time and thought. All this care has a great effect on the future cow. I have raised but one heifer, pure bred or grade, to cowhood in 15 years, that would not produce 300 pounds of butter and over a year. It is this careful developing, care and feed. I believe, aided by good breeding, that has given me these results.

Don't you think I have made a good deal more money with my cows by this method, than I would if I had pursued the common neglectful way? Farmers have not yet begun to half think, on the fine possibilities there are in the production of valuable cows. The demand for dairy products, all over the Union, is far ahead of the supply. And the cleaner, sweeter, more perfect we make that product the more does the demand increase.

Think of the demand there is, today, for good cows. A few weeks ago Mr. F. B. Fargo, of Lake Mills, Wis., placed a five-line ad. in Hoard's Dairyman, offering to furnish Holstein grade cows by the car load. In two weeks' time he had received hundreds of letters, as far distant as Texas, Mexico, California, Oregon and the States on the Atlantic coast, the writers of which were all anxious for one or more car loads. He was amazed at the demand. It is so in other dairy breeds. Don't you think it will pay to turn your attention to the question of producing superior cows for your own use and the market?

The present methods of handling cows, in the great milk producing centers, amounts to the destruction almost of all calf raising. Cows are bought, fed high for a year or so, and sold to the butcher. This makes all the better, the chance for the intelligent, far sighted, dairy farmer to make a handsome profit in growing cows to supply that market.

### A Good Bull.

There is a great host of dairy farmers who cannot yet see the cash advantage of buying a pure-bred bull and paying the going price for him. The price blinds their eyes, and so they go around looking for a cheap bull, not one that can bring them something good in return. They will say, "Oh, I'm not breeding registered stock. I cannot afford to pay the regular price for a bull." That is short sighted economy as sure as they live. They are keeping down the quality of their own cows in the future and the value of the young heifers they may want to sell. An Illinois man who annually buys over a hundred thousand dollars' worth of cows and heifers in Jefferson county, Wis.. said to me recently, "I buy a cow on her looks, but I never buy a heifer until I take a look at her sire. If he is a good one, I am more confident of the value of the heifer."

Now, here is a practical example drawn from my own experience: In February, 1902, the Guernsey bull, Starlight's Excelsior 7992, was born. He was bred by the late N. P. Fairbanks, of Lake Geneva, Wis. I bought him when little more than a calf, paying a price up in the hundreds for him. I was attracted to him by the rich character of his pedigree, the excellent record of the cows back of him and his strong prepotent appearance. He will be five years old February next, and is in his prime. From that bull I have sold $810 worth of grade Guernsey heifer calves, $1,500 worth of registered heifer calves, $2,000 worth of registered bull calves, making a total of cash sales of calves, from him, of $4,310. I have on hand six of his heifers in milk two years old that I can sell any day for $1,500, and 18 of his calves with nine more to come that are worth at a low estimate $2,500. This makes the total value of his stock up to date, $8,310. Cut it in two, giving one-half of the value to the cows and then the bull stands credited with $4,155. Could I afford to pay a good price for him?

When I was a boy I read in an old almamac this verse:

"A fiddler had a cow and he had nothing for
to feed her,
So he took his fiddle and played the tune
'Consider, cow! consider.' "

Allow me for a few minutes to ring the changes on the word "consider." Please consider that the grade heifer calves of this bull, such as any farmer can raise if he will but have rich blood in the bull to start with, brought me $810, double what he cost me. It is hard to make dairy farmers see that they want good well-bred stock themselves; next, that there are thousands of other farmers that want it more than they do and are willing to pay for it. Consider, that there is no one form of our live stock today that is so scarce as good cows: that in the natural evolution of public conviction, cows will be scarcer owing to weeding out of unfit cows and consequent reduction of the size of the herds; that the consumption of milk as a food is increasing to an enormous extent and as a consequence is stiffen- he had no such ideas? He lives on a rented farm of 171 acres and he gives cash receipts of the farm in butter, cream, hogs, poultry, young cattle, etc., to the amount of $4,000 annually and he has half of it. Don't you think it pays him to practice advanc.d ideas of farming?

### The Matter of Breed.

It is a common thing to hear men say: "Pay no attention to the matter of breed in cows. What you want is a cow that will do business at the pail." That sort of talk is very superficial. The question of breed is a very important one. The farmers of Minnesota followed Prof. Shaw for years and as he told them, selected beef bred bulls to breed "dual purpose" cows for dairy work. They found at last, to their sorrow, that they were getting the losing end of the bargain. Their cows were failures as dairy animals. Hoard's Dairyman warned them against the practice, and anybody who had an understanding of the effects of breed on feed, could have told them the same. For years the farmers of Iowa have been advised the same thing. All the forces of agricultural education were put in requisition to hold them to the "dual purpose" idea. But the cows resulting from such breeding are not, as a rule, economic dairy animals.

The Iowa farmers, those of them who are looking into the thing, are finding that with such cows, they are losing more at the pail than they are making in beef. And so they are geting around. Hoard's Dairyman has for years preached this doctrine: If you want milk you must breed for it, and breed for it specifically.

Mistakes in breeding are a long time in making themselves felt. Hence the importance to every farmer that he should have ing the prices of butter and cheese. In most of the butter and cheese producing districts there is a noticeable lessening of production owing to the drainage of cows away to other sections for city milk production.

Consider, that in all these city milk producing districts there are but very few calves raised, while the cows are kept rarely more than three years.

Consider, that only one-half of all the calves are heifers and of these but a small percentage reach cowhood, that consequently the increase of cows in so great a dairy state as Wisconsin has been only 5¼ per cent yearly from 1850 to 1900. Consider, that every child born is a consumer of milk but not always of meat.

Consider, the enormous increase in the population of this country, vastly ahead of the increase in the cow population. Consider, all these things as having a bearing on the future of the dairy industry and then tell me if you do not think there is a good prospect ahead for the farmer who will go into the business of producing and rearing first class dairy cows, bred from sires of undoubted dairy parentage.

I have a neighbor, a bright keen German dairy farmer. He buys, every four or five years, the best registered Guernsey bull calf he can find to replace his old bull in a year or so. He pays handsome prices for his bulls and he will not buy a cheap animal. Mind you his herd is nearly all grade cows. He is a fine calf raiser and sells annually from 8 to 10 prime young heifers and yearlings for from $25 to $40 each, and he has quick sale for all he can produce. He will tell you every time that the great factor of success with him is the high quality of the bull he keeps. Don't you think his advanced ideas pay him better than as though correct ideas as to the principles of breeding. No wonder that he is confused when well-known teachers and breeders juggle with these principles. It is as though one said, "Twice two is either three or five just as you want it." Yes, there is a great deal in breed. We once heard a story of a "dual purpose" man who went to hire out as a teacher of a country district school. The clerk asked him a few questions among which was this: "Is the earth round or flat?" "Well," said the man, "I teaches em both ways, just as they want."

A great many farmers have wanted "dual purpose" cows if they could get them. They called for that kind of teaching and they got it. But it was wrong, and they are finding it out in the last analysis of real practical results, at the pail. The farmers who staid by the dairy bred cow are winning by it. Yes! there is a good deal in breed.

I spoke of the effect of breed on feed. There is a great mystery here, that no man has solved. Here stands a bale of hay. On one side is a cow; on the other is a sheep, on the other a horse. In one case the result is milk, in the other wool, in the other speed or draft, and the same mystery appears in the same family of animals. Twelve quarts of oats fed to J. I. C. resulted in a mile in 2:10. That was the speed product of 12 quarts of oats, provided they were

fed to J. I. C. Two cows stand side by side in my barn. They are of the same breed, and both are fed the same ration. One cow takes that food and turns out two pounds of butter fat a day, the other one pound. What is that secret through which comes such a wide disparity of results? So far as we can see, it is individuality.

Now, men have seized upon these individual traits in animals. They are functional in character. By steadfast, patient work, mating agreeing individualities or functions together, after a long time they have established these traits as breed characteristics and we have the speed or draft function in horses, the milk and butter trait, or the meat producing trait in cattle, the fine wool or mutton function in sheep, and so on. A great variety of ruling traits have been established. But it is very slow work. Nature yields but reluctantly to any and all modifications of structure and specific purpose.

The modern dairy cow, as has been well said, is an artificial product. She is greatly needed in the sharp, close economy of our farming work because of the greatly increasing demand for her product. This modern dairy cow is not a rustler. She must be given the care, surroundings or environment, and feed suitable to her artifical nature, if you expect the results she is capable of giving.

Then comes this everlasting proposition of farm economics, reducing the cost of production. When I turn to those two cows, one giving me twice the product for the same cost of food that the other does, I naturally enquire how this comes. Now when veloping care and feed, I believe, aided by I find that the first cow comes down from a better line of producing ancestors than the other, it is apt to impress me with the idea that there is something in breeding, not everything, but something.

Now, all there is to this question of breeding for specific qualities or traits, is the attempt to establish as a breed characteristic, that which originally existed as an individual characteristic. So after a long time, we have the Holstein cow with her peculiar traits, bred into her for a thousand years; the Ayrshire with hers, the Jersey and the Guernsey with theirs. If you study her you will find that Nature does her best work in straight lines, and in obedience to single purposes. If you attempt to make her construct a combined speed and draft horse, or a combined milk and beef cow, she tells you at once that the structural type or form of each is different, owing to the demand of differing functions, the same as the difference in form of the sewing machine and the mowing machine.

She tells you also that established prepotencies of heredity, one opposing the other, cannot be mated and combined to the establishment of a third prepotency partaking of the nature of both.

She tells you further, that such a forced combination results in a conflict of prepotencies and no wise breeder will set Nature to fighting herself. Our "dual purpose" friends have made one serious mistake. They have based their theory too much on the sporadic or occasional appearance of some most excellent cow here and there in their ranks. They have gone on building the beefiest bulls they could produce, paying no attention to the laws of dairy form and function, and expecting profitable milk results from such a contradictory combination.

I have asked for years this question: "Where are the Shorthorn bulls, for instance, that show in their form and outline, a milk heredity, or that can be depended on to breed with any profitable certainty for milk production? This ignoring almost altogether the male line of descent, all the time breeding from the beefiest of beef heredity, and then talking about "a milking strain" is unscintific, impracticable, and as the old Yankee said, "insensible."

## SPECIAL DAIRY SESSION

### Discussion Led by Mr. P. C. Holme of Baltimore

The question with us has been to get a good standard brand of prints. We sell at two to three cents higher than ordinary, and we pay two cents more to our nearby creameries. * * *I am sorry that two creameries from Pennsylvania which have been furnishing us with half-pound prints, have been turned down because of the continued poor quality, and we are putting in a line of prints from Minnesota. Now when I think that it is only about thirty miles from the creamery here, and on the other hand, we can get only one shipment from Minnesota per week, and it takes six or eight days to come through, be put up in one-half pound prints and then we sell it as fine standard grade, it shows that there must be a difference between the Minnesota butter, and that from Pennsylvania. Now why is it? We have just as good pasture land in Pennsylvania and as fine soil as anywhere in the West. There must be some reason for it. I am firmly convinced that the reason is of the greater interest taken in that State in the dairy business and the amount of appropriation and efficiency of their dairy schools, and the efficiency of their State Inspection. Look as an illustration at the two butters, and remember that one is of the selection from four nearby creameries and the other is a selection of three of the western creameries. I said to one of the salesmen only yesterday, "Are you having trouble with the one-half pound prints?" He said, "We are putting out the butter from the West and are having no trouble at all."

Now, of course, the great trouble with the eastern creamery is the acceptance of poor milk. We can tell you without ever being informed or without the number of shipments, when farmers deliver the milk each day or every other day to the creamery. We do not have to be told. There is a taint about the butter, which develops more and more, and I think that that could be corrected to a large extent if we had more intelligent butter makers. I do not mean to cast any reflection upon any of you. As I said, I do not know anything about a large number of creameries. I know this,—that in twelve years we have been making selections we have tried a large number of creameries in Maryland, and I am sorry to have to say that we have not selected one that meets our demands, and I do not believe that we are over critical. We have invaded Pennsylvania and as a result of trial we have retained two from twelve. During certain times of the year we cannot handle their product, and I am certain that it is largely due to their acceptance of stale milk or milk that has been handled in cans that are not clean, and lack of knowledge on the part of butter makers. I see no rule except the establishment of first class dairy schools and a number of inspectors. As Prof. Van Norman told you, we are to call upon him for assistance. What we want is an expert buttermaker to go to creameries at our expense and spend several months at each creamery in close contact, and give them practical instruction in buttermaking. At this time the State could not furnish a man, but in Minnesota they would send an inspector, at their own expense, and if there were any difficulties in the creamery they would be cured, and that would also be the case in several other States in the west, and yet there is not sufficient appropriation in this State to pay the expense and furnish an expert. * * * I am not in the habit of speaking at conventions of this kind. I was invited simply to talk a few minutes, and I do not know that I have anything further to add. I am prepared to answer any questions that anybody may want to ask. That is, I am not prepared to give the solution, but if I can answer them, understand me, I shall do so.

Mr. Pearson of Berks County.—Are the Elgin creameries buying milk or are they buying cream that has been separated?

Mr. Holme.—My impression is that a large number of them are buying milk, or at least so far as my knowledge goes the creameries that are getting the milk and separating it themselves are doing the best work. I believe that it is altogether possible for the creameries to be run upon other conditions, but I think the tendency is to exaggerate the trouble already spoken of with the acceptance of stale milk or cream rather than to remedy it. You can see that if a man separates cream at home and has a few gallons of cream. he waits until he gets more, and is certainly much more likely to extend the time of taking the cream to the creamery than to lessen it, and judging from what I have seen of the western butter people, and looking at it from one source, of the few that keep creameries and accept the cream, they do not uniformly make as good butter as those that accept milk.

Mr. North.—In what way do the demands of your customers differ from other markets? I understand that most markets have an entirely different style.

Mr. Holme.—We should say that our market differs from the average market in demanding a higher color, in demanding more salt and in demanding and as a rule accepting a little less working. I should pay that we accept butter less worked than Philadelphia market, not so dry and more salt. However, what we want is a good, clean flavored butter.

Mr. Sharpe.—May I ask a question? Does your dry-worked butter keep better than butter not worked so dry,—when in storage I mean?

Mr. Holme.—We have not had much experience with dry-worked butter. I have think that I can say of butter from the West, but not until this winter, it came out in good condition, but I am not able to say that it is better than other butter not so dry.

Further than this, the man who works his butter more is more apt to injure the keeping quality. However, to salt buttetr over and over again would apparently add considerable moisture to it. You know that question of moisture, however, is something more apparent than real. We sometimes have considerable complaint of persons thinking butter wonderfully salty when it is not.

Qestion—Is the keeping quality of butter influenced by the washing or the butter milk in it?

Mr.Holme.—I do not know that I am qualified to say, but I should say not. I should say that the keeping quality of butter was dependent first upon the quality of the milk. This I know was the experience of one of our butter makers who ran a creamery himself, and had some rejected cream sent back immediately. This was in perfect condition, and they tell me he used to churn it up with the rest of the cream, and for the first two or three days they would not notice any difference, but suddenly the butter would become shorter, and they attributed it to the taint from that small amount of cream, and they stopped that butter was very much improved. I think that the poor keeping quality is due to the practice and the keeping quality of cream or milk that is not in the right condition, although I do not know very much on this particular point.

Prof. Van Norman.—I wish this question would come up later when the government expert will be here, and he can doubtless give us some information on that point from the Government's experience in cold storage work.

M. Knuppenberg of Wyoming County.—I would like to hear something concerning the milk can, whether it is better for patrons to take care of the cans or to have them taken care of at the creamery? What is the practice of the gentlemen here?

Mr. Henry.—I have never had experience to speak of. I know that in New York the creameries are doing it for themselves, and not allowing patrons to take home skim milk in cans.

Prof. Van Norman:—

At State College we are running a commercial creamery, and we are up against the same proposition, and at present are allowing them to take home the skim milk in the delivery cans, and making butter that would be a little above "extras." We are not making the best butter that can be made, for the reason that many of our patrons are farmers, who keep small herds, and you cannot get as good milk from men who keep from five to eight cows as you can from men with twenty cows or more. We are trying to work the business up to a still higher standard. Some of our western creameries are requiring all skim milk to be pasteurized, and that it is returned hot, and that acts as a sterilizer of the cans. If emptied promptly and washed that should give satisfaction. I would like to know the experience of the creamerymen here.

Mr. Cornell of Troy.—I am much interested in all these talks, but I believe that the creamerymen must meet the conditions as they are, and not as they would like to have them. With reference to the talk of

receiving whole milk, I am satisfied that the gentleman from Baltimore, who addressed us in this regard is right,—that the better butter is made, as he suggests, but we have the hand separator with us and it is here to stay. We must meet the conditions. It is a problem that can be worked out. We receive whole milk and cream. Now I advocate the hand separator. I believe that it is the only way for the farmers to produce milk and patronize the creameries, and when enough have them that you can put a team on the road and gather that cream we have the whole proposition within our control. You can go to that farmer every day and get the cream direct from the farm, and that would be the best condition, and no skim milk back in the cans. If we could come to the condition where we could collect this cream every day, we could go in hot weather every day, this would be the proposition that I would like to get at in our section. Since the hand separators are there and there to stay I would like to put a hand separator into the hands of each of our patrons, and this would save what it would cost to run our separators, then we could put the team on the road, and if we had any complaints from the market we could trace it right back, and if the butter is not right, we could see just where we collected the poor cream. Now this is my view, and I would like to hear from others, —what their experience is with the hand separator?

Mr. Pearson.—I have no business to talk here, because I am not connected with it, but I am a buttermaker and farmer. I have a separator, not a hand separator, but a farm separator, and I make butter and sell it to customers in the city of Reading, and it has always seemed to me theoretically at least, we should be able to make the best butter, better than the creamery milk is separated right from the cows as that collects cream once a day, because our good as you can get it, but it seems to me that the separator rids us of all bacteria or at least a large portion of it before they have a chance to increase in a great degree. At a small place like mine the trouble is not in caring for the cream, but it seems to me that the care required for the cream is much less than that required for the milk. It is probably something I should not tell. We churn only once per week. The larger creameries say this is not good, but I know that my customers say it is good, and they like it better than the best creamery butter that I can buy at the grocery stores as a substitute when I do not have enough of my own to handle.

Mr. Watson.—Let me ask the gentleman who spoke of hand separators, how often they collect the cream or how long it stays at thefarm before it is required of them to bring to the creamery? This is the question I would like to find out. We have trouble to get our farmers to bring it often enough.

Mr. Cornell.—We are placed in the same position in the milk and cream question that has been described. We are at the mercy of the farmer, because there is not enough to make it practical for us to go after it. We have had the same conditions as described. When it gets cooler they come three times a week, as the case may be. It is so with the hand separated cream. They bring it when they feel disposed, and we have to take it, of course, because we know that if we don't the other fellow will, but in hot weather we insist in so far as we can that they bring it three times a week. At present they come twice a week, but occasionally a man meets with bad roads, and then only brings it once a week. I am trying to work with the farmers and get them to put in hand separators, so that we can go to each of the houses and feel independent.

Mr. Perham.—In regard to the hand separator business I want to say just one word. Now at our creamery (at Niagara, Pa.) this summer we had ninety patrons, and sixty out of the ninety brought cream from hand separators, but during the hot weather we made them come each day, the same as with milk. Now for one lot where the farmers live two to four miles apart, we had sixteen in that lot. We furnished them with a wagon and they took turns going for the cream. That is, once in sixteen days, each farmer had to go for the cream, so that it did not fall but twice a month for each one, and we made them come every day until cold weather, although with three or four who had very cold spring water we allowed them to come every other day, but unless they had that, every day, and we did not have any trouble along that line by so doing.

Major Wells.—I did not hear all the remarks, but came in about the time of the asking of the question, but the question I have to ask is derived from a conversation with a Minnhsota man. We were discussing the difficulty of poor quality of cream and infrequent delivery of it, and in washing separators, and all things connected with it, and I asked him why such conditions prevailed. He said, "there is positively no inducement to improve." Well now, that coming from an official seemed strange until he explained it, and said that they do not get any more of those creameries that manufacture first class butter than they would get for the poor class, and I thought perhaps this gentleman might set us right in this subject. He says that butter in the West, at least the bulk of it, is contracted for by the New York commission dealers, and the price is uniform, and what they lose on poor butter they make up on the good, and so make out their profit in that way, and careless people get as much as those that are particular, and I would like to know what inducement the dealers or commission merchants offer to improvement. It is putting a new phase on the subject.

Mr. Holme.—I am not in the commission business, we are rather butter dealers. We handle seven or eight thousand pounds per week. I believe there is truth in what you say but not all truth. We have one large shipper in the West who has several creameries. During the last part of the year, when we handle the most, his butter was superior to others, and we wrote to them telling them that we could give them one-half cent more than we were giving the others, in order to get it from the creamery, and then there is another point about it. I think it is largely true within certain bounds, that is where there is first class butter and that which is a little inferior, I think they will sell, perhaps, for the same price at the two creameries, but if it is a good brand. it will always find a market. and if some competitor finds that it is of good quality he will offer them a slight advance. That has been our experience, and

I have found that when a commission man gets a butter that is strictly first class, he will offer one-half cent more for it. At the same time, on the other hand, the man who makes the better butter will always find a market, and he will have no trouble in getting rid of a surplus, while the other man may have a different experience. It is safe to say that you will make out best with the best article you can get, but nevertheless it is a difficult thing to convince them that anything is the matter with their butter because they are accustomed to the taste.

Major Wells.—I went back on the market with butter one summer, with one hundred pounds per day, and could not find a market to suit me. It went on the market at fifteen cents per pound, and that was followed up, and in but a comparatively short time we were getting for the same one-half cent per pound more for that butter and the commission house wrote to me asking why it was that our butter stood up better, and gradually the quality of that butter made a place for itself, and my experience would convince me that any creamery man who is putting out a first class article on the market will find that it makes a place for itself, and he will soon get the returns that the ordinary commission makes for good butter, paying an extra price over the poor. My experience would tend to show that you can absolutely rely upon good butter making a place for itself.

Mr. Cornell.—In regard to the commission man I do not think that we butter makers here in the East have any right to depend upon the commission man for marketing our products, as they are supplied largely from the West. But from the standpoint of those persons,—are not the commission houses up against the same thing as we? Why do we not make a difference between the milk that comes to our creameries? The commission merchants have exactly the same thing to face. Hence they do not always make returns according t o quality, but we should have a limit for our own goods in this regard, and we should have our own market and cater to it. If we are to market in Philidelphia we should certainly study that. If we have a certain dealer we should study his wants and needs. I can see the commission merchant's position just as clearly as I see our own, and it is the very question to meet.

Mr. Smarzo.—I want to say that if the creameryman sends in good butter, he will get more than some other for first class butter, but if seconds or thirds, he may find a market today for the seconds and thirds for the reason that butter is scarce and the commission man needs it and the people need it, and he is benefited by two cents on all, and the same way with thirds, but the man with extras gets a very high price. It is the lower grades that vary.

Prof. VanNorman.—I want to emphasize this point. I saw four hundred tubs of butter scored at St. Louis three of the four months, it was sent to the Exposition. I have been in the New York market, and this I am prepared to say, that first class butter is first class in all the big markets. There are commission men who are not good judges of butter, but they have built up a line of trade and have the kind of butter to meet the trade, but they will all agree on it that good butter on the market it is good butter wherever you go.

Mr. Smarzo.—I came here to score the butter. I did not come to make a speech, I am not a specialist in speech-making and could not make a speech, but I notice that your talk is mostly on quality and that it is universal over the United States more than ever before. I know this is the case and it is not a talk on the markets which I wish to make. Now whose is the fault in this quality question? A few years ago we did not have so much quality talk because the butter was of better quality. What has brought about this condition? I speak of the New York market because I am most familiar with it, and not so familiar with the other markets, yet I hear many complaints. I am going to speak from the sandpoint of the Iowa butterman, as I see very little of the product of the Pennsylvania man,—only what I saw this morning. Now at the start in Iowa and Minnesota it was the hand separator question which brought about the low grade of butter. The trouble was in the start. The hand separator man went about and said. "We want to sell you a hand separator, and you will get just as good results, and you do not have to cart the milk to the creamery," and then the man would "say, must I wash this separator every day?" And he would answer, "No, only every other day." Right here at the start I want to say that the man who is making butter and who does not wash his separator regularly and carefully had better get out of the business, because he is filthy. Yes, filthy, I say, and he should be put out of the business. Unless you furnish the buttermaker with first class cream he can not make first class butter. An inspector from Iowa when asked what the trouble was there said that a good many of the farmers were not washing their machines every time they used them, and the man asking the question said, "You mean to tell me that every time my hand separator is used I have to wash it?" He was told that was the thing to do. No one should be in the dairy business who does not wash the hand separator properly.

(Concerning the butter scoring Mr. Smarzo spoke in part as follows:)

I find nearly all the butter scored, showing poor workmanship. In fact, I have picked out only two pieces which show fine workmanship. I understand that there are three or four creameries in this State, shipping butter, who represented the complaints about the quality of the butter, and the buyer had to go to Minnesota, and pay more money for it to get what he needed. Now, I think it is a disgrace to have to go away and get butter, when you can make just as good butter right here in Pennsylvania, if you will only get into line and study the conditions well.

Prof. Van Norman.—How many here today sell butter to commission men? (No hands.)

Mr. Detweiler.—Is there any advantage in pastuerizing sweet cream?

Answer.—You mean cream gathered on the farm. We say that it is just temporary, after five or six days it is just as bad as before. Some persons think it is all right, but I do not think it is satisfactory.

Prof. Van Norman our best western creameries pasteurize their cream.

Mr. Cornell.—Are those creameymen who pasteurize receiving cream every day or how often a week?

Answer.—Every other day, and I do not think that creameries should receive cream more than two days old.

Mr. Cornell.—However, if you do not receive it, do you think it will help it to be pasteurized?

Answer.—I cannot answer that just now.

Mr. Heilman.—Is the acid test practical for the farm butter maker?

Answer.—Yes, I think so, a very simple test.

Prof. Van Norman.—I would say it is a question as to whether you have the time to bother with it. If you are making five cents' worth of butter you certainly can't afford to take ten cents' worth of time to test. The small butter maker cannot afford to do it.

Mr. Neidig.—I should like to know what commercial starter to use?

Answer.—Any commercial starter is all right or will bring about the same results, only some develop faster than others, but you can get accustomed to any of them, and you will get good results, but I would urge upon you the importance of standing by any starter that you start with. Do not jump from one of these to another. Some work very rapidly. You may set one at eleven o'clock, and others would be ready until morning. However, as I said, you get accustomed to the time and nature of different starters.

Mr. Leonard.—Is it necessary for the farm dairyman to use a commercial starter?

Answer.—I would not advise him to go to the trouble, unless he makes quite a little butter and has trouble with the conditions not being perfectly clean. I do not think it necessary.

Question.—I would like to hear that question in butter discussed in regard to the keeping quality.

Prof. Van Norman.—In regard to the influence of water in butter, you mean?

Member.—Yes.

Prof. Van Norman.—I was in Washington the other day and Mr. Webster told me that they are experimenting in that line. Butter containing over sixteen per cent water is considered adulterated, and some are taking advantage of that and are approaching the limit as nearly as possible. Now we find that ordinarily in making butter you will not exceed fourteen or fourteen and one-half per cent of moisture.

Mr. Reeder.—What is the right temperature?

Answer.—That depends upon the percent of fat in the cream. If a lower percent of fat, the higher temperature.

You cannot have a fixed temperature at which cream should be churned.

Question by member.—How about sixty or sixty-two?

Answer.—I would not go as high as that.

Question by member.—At what temperature do you churn?

Prof. Van Norman.—We churn at about fifty-four in our factory work.

Mr. Hartley of Warren.—What difference should there be in the temperature between the time of putting the cream into the churn and the temperature of buttermilk after churning is over?

Answer.—Not more than one or two degrees. That would depend upon the temperature of the room.

Remark by questioner.—My reason for asking was that anyone could test buttermilk if he did not know much about making butter, but I have found that butter came out nice in the granules if you put the cream in the churn about the same temperature.

Answer.—That may be true, and I am not familiar with dairying and dairy butter.

Prof. Van Norman.—Two degrees below that would be safe. I said that would be a safe temperature and would bring butter in about twenty to thirty minutes in good condiion.

Mr. Smarzo.—I notice that a good deal of this butter here is salvy and the washing has affected the texture of this. Use a theremometer, and get the right temperature for the rinse water.

Mr. Morgan.—Did I understand Mr. Smarzo to say that the best temperature at which to churn depends upon the test of percentage of butter fat in the cream?

Mr. Smarzo.—That is correct.

Member.—I have a farm dealing out milk from about twenty Guernseys at the rate of five percent. We had been churning at sixty degrees, and I have argued with the butter maker thathe was churning at too high a temperature, but immediately after drawing the buttermilk he puts the butter in cold spring water and washes it as long as there is any color in the water, and we are making pretty good butter, but I see by your remarks here that we are going wrong.

Mr. Smarzo.—I am afraid that you are liable to make the butter brittle with that temperature. I would lower it down and have the butter to come in the form of granules, and watch the temperature of the water, and use it only about two degrees more. Wheat degree of water do you use?

Member who asked question.—I judge it is forty-five. It is pretty cold water.

Mr. Herman.—I would like to hear of butter milk in relation to keeping quality.

Mr. Smarzo.—It does injure the keeping quality of butter. It should not be present, and if churned at the right temperature you will have no trouble with it. There are people injuring butter by washing it too much, as the granules are not only injured by this washing, but when given two or three washings they wash out the delicate flavor and seriously injure the texture, really one good washing is all that is necessary. You should not have any buttermilk in your butter to work out if the temperature is all right and the other methods are followed out properly. * * * I know that my mother used to work out the buttermilk because her temperature was not right, but I can see now hat she injured the butter in order to get out the buttermilk.

Mr. Pearson.—Suppose in stopping your churn you miss it by a trifle? That is, it seems to me it is almost impossible to stop the churn when it is in the exact condition for washing out the milk. Therefore, would it not be better ordinarily to make it a reason for washing out with two waters?

Answer.—There is the question of temperature again. If the temperature is all right you can meet this, but if the temperature is too high it requires two or three washings.

Remark. It would seem to me reasonable that two washings should not injure the butter to any great extent?

Answer by Mr. Smarzo.—But it is not necessary if the conditions are right.

Remark by Member.—I had a little experience the past year with a customer who wanted dry butter, and I worked to get the buttermilk out and also the water, and I old him that I was sending it to him as dry as possible without injuring the butter, and he wrote to me, "You go ahead and work out the buttermilk until you get the moisture all out of it and I will be responsible." I did so and the butter was satisfactory, and he handled all that I could give him that season, but from my point of view it was over-worked. Now a little of that butter we put in storage and it has a poor flavor, which borders on the fishy taste from what our experience has been with others. Now what causes the fishy flavor in butter?

Answer.—We have not been able to determine but we find that fishy flavor in butter that has been overworked. Now a lot of people think it comes from salt, but I found it in two or three shipments of sweet butter, the same thing.

Remark.—A 1 butter that has been in storage and comes out with a salty taste will stand the pressure of the market better than butter that does not have it.

Remark by member.—That is because it has the right kind of acid. The acid gives it the good flavor and keeping quality.

Question by member.—I am wondering if some buttermilk was left in it how it would act?

Mr. Smarzo.—If there is any buttermilk in it, it is better to be taken out, and it is better to have the cream in good condition and the temperature will govern all that, so you will not have to work it out.

Member.—How often do you wash the butter at State College?

Prof. Van Norman.—I have two helpers here with me from State College and I will let them answer your question.

Mr. Knoll has been with me ever since I have been at State College, and Mr. Fortina can also give you some information.

Mr. Knoll.—We find usually that once is the condition that gives the best satisfaction, though if not sufficient we wash it twice. When the water runs off clear it is enough.

Mr. Fortina.—With our student work, generally twice, because the students (many of them) find it difficult to have the conditions right, and they are called to classes and in that way get different temperatures which will cause the butter to become salvy or hold buttermilk at a high temperature, so we generally wash twice.

Question by member.—I would like to ask the buttermaker a question. He says it is enough when the wash water runs clear. Did he ever see the water run clear from the churn?

Mr. Knoll.—Yes sir, I have.

Prof. Van Norman. That depends upon the churn.

Question by member.—In churning butter how large would you say the granules should be?

Prof. Van Norman.—I usually recommend that the churning be stopped when granules float well up in the buttermilk. The point is to get the buttermilk out, and as soon as it will drain out clear, stop. It is usually said that the butter granules should be the size of wheat kernels. All these questions hang together, and you can follow out the practice of any one question and get satisfaction. They dove-tail together. Temperature is a very important factor,—not only must you have it right to start, but you should also have it right a couple of hours before churning. I should say about the size of a kernel of wheat is our standard size of the granules.

Mr. Herman.—What benefit is derived from cooling cream down to the churning point so long before churning?

Prof. Van Norman.—The liquid part responds more rapidly and that gives your temperature on the theremometer, yet the fat has not cooled as much.

Address by E. H. Webster.

I represent the Dairy Division of the Department at Washington, and I may have something to say to you this afternoon, but I wish to call your attention just now, while Mr. Smarzo is getting ready, to the nature of the work by the Dairy Division and what it is trying to do for you. Mr. Smarzo is personally representing that line of work, and it consists in placing at the disposal of and giving information that is of value to the dairymen. I know from the way you are asking questions of the difficulties of ascertaining what the trouble is with your butter. Now we have Mr. Smarzo at New York and Mr. Credicott at Chicago going about to the commission houses and communicating directly with the butter makers through the State authorities, showing what the trouble is with their butter that it is not up to the highest grade, and trying to ascertain in this manner what the methods are of the butter makers whose butter is not to the highest grade. In this way the work is strictly educational, and it shows the way for better prices, for purer grades and quality. I want to tell you of all this, because it will make you understand what we are doing at Washington along this line of work in which you are interested, and we are also trying to do the same things for other dairy interests, such as cheese making and dairying, butter making, or anything that puzzles you, you may feel free to write to the Dairy Division at Washington, and some one will be glad to afford you any assistance possible. We want to help along all lines of dairying, and especially along the line of actual profit in the dairy industry.

Prof. Van Norman.—The Dairy Union has a lot of expense in a meeting like this and we want a lot of members and dollars, and there are a great many persons in this State interested in this industry, and we want to push along this movement, and I am going to ask our Treasurer to pass around among you. and if any of you feel disposed or care to give him a dollar. he will be glad to take it and furnish you with a badge, and the Secretary will give you a receipt.

Prof. Van Norman.—The Dairy Union has been leaning on the Breeders' Association for a number of years back. Now, the question before us is **shall we try to hold a separate meeting next year?** The Breeders want to go to Pittsburg. Shall we go with them, or shall we come here or go to some eastern part of the State? Now I would like to hear this proposition discussed. I would also like to remind you of the fact that if we are going to get a display of dairy and creamery machinery, we have to hold our meetings where those people will come, and moreover we have got to do business with them, and I think it very important that we study their apparatus and make purchases in so far as possible from them. If we do this we can surely develop a creditable showing in this State. This State ranks second in dairy products, and yet we have not had a dairy show for several years. I have been very much pleased with the start we have made. Now are there towns in this State that will do as much for us as the cities and towns in other States,—furnish a place to meet in, donate money. Now **can we go where we can have all dairy or must we join forces with the live stock people?**

Our dairy subjects represent a great many phases, and here we are trying to have one small session covering these various branches of the industry. We confined our meeting to the butter making problem, and we should take up many other problems. Now think of the many things of interest to many of us. I would like to see the Dairy Meeting cover at least two days and give all that time to these subjects that are productive of dairying, and I would like to hear the expression of what you think, what you would like to have and like to do.

Mr. Morgan.—I am new in the business, very new, but it would seem to me that we could hold a separate session at the same place as the Breeders' Association, and we would thus have the advantage in this way. There are some of us interested not only in dairying but also in the live stock and thus in the Breeders' Association, and we could lessen the expense of travel by holding the sessions jointly. That is, I mean on the same dates, although I think it might be better to have separate meetings. I was much inerested in the programs of both sessions planned for this morning. Fortunately, the one thing I wanted to hear was Prof. Hayward who spoke last night, but my opinion would be the two meetings on separate dates.

Mr. Leonard.—I should be more in favor of having the Dairy Union and Breeders' Association meet in one town, for the very reason that it would save you one fare, and we could have the meetings two days apart. We would then have the privilege of attending both meetings. I think it would be well for us to do this as it would enable us to attend both meetings with one trip. But let us have it in the central part of the State. Some of us have to come a great way, and we could save travel if we could have it at some central point in this way.

Prof. Van Norman.—Pittsburg would be just as far to get to, and the Breeders are going there whatever we do. The question now is, shall we go with them or not?

Question.—Where is the bulk ofthe dairy interest, in the western or eastern part of the State. I would suggest holding it as nearly central in relation to the dairy interests as possible.

Answer.—The milk is shipped in the East and the butter and cheese making is in the North, all parts have some.

Remark. I thought that the central part of the dairy interests would be East of the center of the State. I am asking for information.

Prof. Van Norman.—That is pretty hard to state. The question is wherever we can have a good meeting.

Mr. Cornell.—I think I expressed myself in the presence of Prof. Van Norman briefly yesterday. If I am correctly informed our butter interest is largely represented along the northern counties, Tioga, Bradford and Susquehanna, and while for me a place like Williamsport is more central, yet I believe place in that section would be easily accessible from all points, and it also represents one of the greatest markets of the State right in that section,and I think it should be interesting from that point. Also the representatives from down below can get up into the section readily, and it would seem to me it would be very poor policy for the dairy interests to go to Pittsburg, and I should more favor moving little from Harrisburg, say toward Williamsport where the meeting has never been. I have considered this question, and I can get into that section next year, and I believe that it would be for the interest of the Dairy Union, and I do not think it policy to carry the meeting to Pittsburg.

Mr. Hartley of Warren County.—Warren and Crawford counties are in the Northwest corner of the State. This is in fact, quite a dairy corner. At one time we had the Pennsylvania Dairy Association of Crawford, Erie and Warran counties. We had it for years, and these people do not get to the East. I think considering all things, that it would be well to get in touch with those people up there, and therefore, I think it would be well to remain one year more with the Breeders, and perhaps in a year or two we may be able to walk alone.

Comments on the Butter Exhibit.

Mr. Smarzo.—All the butter exhibited came in prints or rolls. Now this is a mistake from the exhibitor's standpoint, for the reason that the print is exposed to the air and all unfavorable conditions around the same. If you would only put it up in stone jars, it will be much more satisfactory. As it is, it is not fit to score a print like that at all. You do not get good results, and I think if you will just kindly the next time pack your butter in five-pound jars or ten-pound jars, it will be well. People make a mistake in sending prints of that kind. I suppose it is the easiest way to send it.

Prof. Van Norman.—I would say that in Western associations they require twenty pounds in a tub, but knowing that most of our creameries here in the East were not used to it, we only required five pounds.

Mr. Notestine from Mifflin County.—I am interested in the dairy business, not in the creamery business, but in the retail milk business, and in the production and sale of it, and it seems to me that there should be an exhibition of milk too, and some way to analyze milk and tell us what it contains and the best way to handle it and all the other points in connection with the butter and creamery exhibits, and I think that our Dairy Union could be improved by it. Also I think that the Dairy Union could be strengthened by having local branches in Counties or County Associations,—say as branches of the Pennsylvania Dairy Union.

Prof. Van Norman.—I would call your attention to the second page of your program, and you will there find prizes offered for exhibits sent in, and I would say that although we have received very few, we are not faint-harted and hope to improve along this line.

Your other suggestion is a good one, and I have this very thing down as one suggestion for my talk this afternoon,—the branch association and its relation to the State Association,—but I am glad to see your interest in the milk business.

No other business appearing we stand adjourned

# LIST OF CREAMERIES IN PENNSYLVANIA

- Adams Co.
  - Bermudia..................B. D. Hostetter
  - Cashtown........Cashtown Creamery Co., L. W. Swartz, Manager.
  - East Berlin....E. Berlin Creamery Assn.
  - East Berlin..................J. D. Hershey
  - Gettysburg..................Jerry J. Plank
  - Guernsey ....................John Geiger
  - Latimore..........Latimore Creamery Co., Jos. Lerew, President
  - New Oxford................J. Diller & Co.
- Allegheny Co.
  - Wilkinsburg........Bright View Dairy Co
- Armstrong Co.
  - Cochran's Mills.Cochran's Mills Creamery
  - Dayton....Dayton Co-op. Creamery Assn.
  - Top.....................King & Woodward
  - Whitesburg.........Whitesburg Creamery Blaney & Son, Props.
  - York Springs..............B. D. Hostetter
- Beaver Co.
  - Hookstown..........Hookstown Creamery
- Bedford Co.
  - Rainsburg.. ................George Morgart
- Berks Co.
  - Bally .......................Frank Janson
  - Bechtelsville..........James Moyer & Bro.
  - Berne........................Levi M. Miller
  - Bernville...........Ahrens & Richardson
  - Bernville.........Bernville Creamery Co.
  - Bethel.............Ahrens & Richardson
  - Bowers............Bowers' Creamery Co.
  - Boyertown........Grimm's Mill Creamery
  - Boyertown...........Boyertown Creamery
  - Calcium ..............Calcium Creamery
  - Calcium..............Cleaver & Hoffman
  - Clayton......Clayton Butter & Cheese Co.
  - Crosskill Mills.......Ahrens & Richardson
  - Douglasville ..........Charles Buckwalter
  - Eshback's ......................Hines Bros
  - Exeter Station.........H. B. Levan & Co.
  - Fleetwood ...........Fleetwood Creamery
  - Fleetwood ...............Daniel Kelchner
  - Hancock .............Hancock Creamery
  - Hamburg........................N. A. Coufer
  - Huff's Church..............Nathan Lehser
  - Kempton .....................M. L. Ritter
  - Kempton Station.......Howard G. Kimmel ..............Excel'r Dairymen's Assn.
  - Klinesville ..........Klinesville Creamery
  - Kutztown ............Kutztown Creamery
  - Landis' Store........Joseph Boyer & Bro.
  - Lenhartsville.....................F. B. Levan
  - Lime Kiln............Oley Line Creamery
  - Little Oley.............Fritzer's Creamery, J. P. Thomas, Prop'r.
  - Lyons Station..............Jno. G. Haring
  - Manatawney ......Pleasantville Creamery
  - Mertztown..................F. Moyer & Co.
  - Mohrsville...........Isaac S. Fraunfelter
  - Morgantown ...................Jacob Hartz
  - Morgantown ......Morgantown Creamery
  - New Berlinville.....Gilbertsville Creamery
  - New Berlinville...........Congo Creamery
  - New Berlinville..............W. H. Moyer
  - New Jerusalem..............J. S. Henrich
  - North Heidelberg........Klapp & Kalback
  - North Heidelberg.......Klopp's Creamery
  - Obold.......................Kalbach & Obold
  - Oley ..............Freidensburg Creamery
  - Oley...........................Hartman & Bros.
  - Reading............Franklin St. Creamery
  - Reading............St. Lawrence Creamery
  - Reading .............Spang & Zacharias
  - Rehrersburg.........Ahrens & Richardson
  - Rehrersburg .......Rehrersburg Creamery
  - Shartlesville.........Ahrens & Richardson
  - Shoemakersville ..Shoemakersville Cream.
  - Stonersville..........Ahrens & Richardson
  - Straustown..........Ahrens & Richardson
  - Topton.........................A. S. Heffner
  - Upper Bern..................Levi M. Miller
  - West Leesport..Samuel H. Lenhart & Son
  - Windsor Castle................M. L. Ritter
  - Yellow House..............Amos Hartman
  - Yellow House............Home Creamery
- Blair Co.
  - Tyrone...........Hoffman Bros. Creamery
  - Henrietta.................Elmer S. Berget
- Bradford Co.
  - Alba...................Alba Butter Mfg. Co.
  - Allis Hollow....Allis Hollow Creamery Co.
  - Allis Hollow.....Union Creamery Co. Ltd.
  - Austinville .......Austinville Co-operative Creamery Co.
  - Brad ..................Wyalusing Creamery
  - Cadis...........................J. W. Prince
  - Camptown..............Fuller & Blocker
  - Canton...............Odee Creamery Co.
  - Canton ...............Glenside Creamery
  - Columbia Cross Roads.......... ............Austinville Creamery Co.
  - Coryland .............Coryland Creamery
  - Durell ...................Durell Creamery
  - East Canton......Silverdale Creamery Co.
  - East Smithfield..............D. A. Stephen
  - East Troy....East Troy Butter Mfg. Co.
  - Grover........................S. S. Vermilya
  - Le Raysville................W. B. Stevens
  - Milan..........Pennsylvania Creamery Co.
  - Minnequa ..................James Ketcham
  - Myersburg........M. Butter & Cheese Co.
  - New Albany..New Albany Creamery Co.
  - North Orwell .............George Pennell
  - North Orwell..............Baker Brothers
  - Potterville.......Potterville Creamery Co.
  - Potterville......Orwell Creamery Co. Ltd.
  - Smithfield .............Stevens Creamery
  - Sayre ..............Harkness Creamery
  - South Warren............Best & Wheaton
  - Stevensville ...........Stevensville Assn.
  - Troy.......................S. H. Heywood
- Bucks Co.
  - Argus .........................C. T. Hixon
  - Bedminster ..........Bedminster Creamery
  - Bedminster................J. F. Hulsheiser
  - Bedminster.....................J. F. Kilmer
  - Bedminster...........Moyer & Hulshiser
  - Blooming Glen...Blooming Glen Creamery
  - Blooming Glen..Pleasant Sprgs Creamery
  - Buckingham ...Blooming Valley Creamery
  - Buckingham...................... Buckingham Valley Dairymen's Assn.
  - Bucksville...............Kaiser & Kramer
  - Bursonville...................Hixon & Mills
  - Carversville .....................Cary Betz
  - Carversville ....................C. Roberts
  - Chalfont ..............Chalfont Creamery
  - Chalfont..................A. H. Faust & Co.
  - Church Hill........Church Hill Creamery
  - Church Hill ......................Jos. Guldin
  - Cressman................Milton H. Hickle
  - Danborough ..........Ottsville Creamery
  - Doylestown..........Cold Spring Dairy Co
  - Dublin ...................Dairymen's Assn.
  - Erwinna ......................George Scott
  - Forest Grove......Forest Grove Creamery
  - Gardenville..............Gotwals & Son
  - Geryville ............Krausdale Creamery
  - Jamison......Warwick Township Creamery
  - Keller's Church.......Wilson S. Atherholt
  - Levin ........................Frank Heterick
  - Makefield ............Makefield Creamery
  - Milford Square...........Henry G. George
  - Milford Square................A. H. Mover
  - Neshaminy.......................W. W. Carr
  - Nockamixon....F. M. Moyer Via Ferndale
  - Nockamixon .......Nockamixon Creamery

  - Ottsville ...............Aaron Leatherman
  - Passer.........................J. H . Shelly
  - Perkasie..................Henry O. Moyer
  - Pipersville ..................A. M. Gerhart
  - Pleasant Valley..........Dimlin & Gerhart
  - Pleasant Valley...............J. H. Shelly
  - Plumsteadville...................... ............Plumsteadville Cream. Assn.
  - Quakertown.....................C. T. Hixon
  - Richlandtown...Keller's Church Creamery
  - Quakertown............William S. Taylor
  - Richardvile Centre........Landis & Moyer
  - Richlandtown .....Richlandtown Creamery
  - Shelly.......................Henry B. Weiss
  - Solebury.............Solebury Dairy Assn
  - Spinnerstown ..........Dairymen's Assn.
  - Springtown...................Hixon & Mills
  - Steinburg....................O. H. Erdman
  - Tohickon .........................J. D. Stover
  - Trumbanersville .....Sinking Springs Cry.
  - Wismer..........Union Dairy Association
  - Zion Hill.................Henry B. Weiss
- Butler Co.
  - Conoquenessing........Stern & Dumbaugh
  - Portersville ..........................H. Oliver
  - Portersville......Portersville Creamer Co.
  - Prospect...........Prospect Creamery Co.
  - Saxonburg.....Saxonburg Elgin Creamery
  - Slippery Rock...Slippery Rock Cream. Co.
- Cambria Co.
  - Carrolltown ...........Farmer's Creamery
- Carbon Co.
  - Little Gap .............W. M. Benninger
- Center Co.
  - Bellefonte..........Rock Farms Creamery
  - Bellefonte..........Howard Creamery Cor.
  - Howard P. O................C. M. Muffley
  - Rebersburg................Frank & Stover
  - Rebersburg....Spring Mills Creamery Co.
  - Spring Mills.......Spring Mills Creamery
  - State Colllege.....State College Creamery
- Chester Co.
  - Anselma ..............Pikeland Creamery
  - Avondale ...........Lamborn's Creamery
  - Brandywine Manor.......Reid's Creamery
  - Buck Run..............Ercildoun Creamery
  - Buck Run............C. J. & J. E. Moore
  - Cedar Knoll ..........Lafayette Creamery
  - Chadds Ford.........E. Darlington & Bro.
  - Chesterville ...................Marvell Bros.
  - Cochranville ...........Cochran Creamery
  - Cochranville .......Cochranville Creamery
  - Collamer ..........................Isaac Evans
  - Collamer..................W. Evans & Son
  - Collamer............................E. B. Herr
  - Cossart ...........Brandywine Creamery
  - Cossart ......................James B. Pyle
  - Doe Run.........................H. A. Clark
  - Doe Run ...........Darlington Creamery
  - Doe Run ...............Milton Darlington
  - Doe Run ......................H. A. Taylor
  - East Coventry...East Coventry Creamery
  - Elk View..........................Dr. Quimby
  - Elk View.................T. Thomas Webb
  - Embreeville...............J. L. Cunningham
  - Fairville .............Sharpless Creamery
  - Font .................Fairmont Creamery
  - Glen Roy............................E. B. Herr
  - Hickory Hill........Hickory Hill Creamery
  - Homerville ................Collamer Dairy
  - Honeybrook.........C. D. & P. H. Emery
  - Honeybrook .......Pennsylvania Creamery
  - Kelton....................S. Morris Jones
  - Keinberton .......................Fry & Barr
  - Kembleville ..............Byers' Creamery
  - Kembleville .......Kembleville Creamery
  - Kennett Square........Bernard's Creamery
  - Kennett Square....Kennett Square Cream.
  - Kennett Square..............Wm. Sharpless
  - Landenburg .............Alfred Sharpless
  - Lenover .........................H. S. Boyd
  - Leonard ..............Rosedale Creamery
  - Lincoln University ..........Niewig Bros.
  - Londonderry ...............J. H. Donald
  - London Grove..............J. C. Sharpless
  - Marsh ........................Marsh Creamery
  - New Garden........New Garden Creamery
  - New London.......................Frank Kirk
  - New London........Theodore Kirk & Son
  - Nottingham..Nt'ng'm Co-operative Cream.
  - Oxford............................Big Elk Dairies
  - Oxford................Hill Crest Creamery
  - Oxford.............H. D. & E. A. Pugh
  - Oxford ...........Geo. D. Woodside & Co.
  - Parksburg ............Cochran Creamery
  - Pheonixville..........Red Bank Creamery
  - Pughtown .........................D. Wadleigh
  - Pomeroy..............M. Darlington Sons
  - Roberts...........Thomas Hatfield & Son
  - Russellville ..........Rusellville Creamery
  - St. Peters.............Farmers' Creamery
  - Schuylkill ............Schuylkill Creamery
  - Sheeder P O......James C. Roberts & Son
  - Sheeder ...................Vincent Creamery
  - Spring City..........Spring City Creamery
  - Suplee ...............Enterprise Creamery
  - Toughkenamon ...........Josiah Lamborn
  - Toughkenamon ............Wm. Sharpless
  - Tweedale...........................E. B. Herr
  - Unionville ...........Unionville Creamery
  - Vincent ................Brindlinger Bros.
  - Vincent.............................E. B. Gasher
  - Vincent ............................R. Heistand
  - Wagontown..........J. H. Schrock & Son
  - Wagontown ....................Harry Schrack
  - Wagontown ..........West Cain Creamery
  - Warwick ......................Marst Creamery
  - West Chester..........Allerton Creamery
  - West Vincent..Lewis H. Evans, Secretary
  - West Chester.....George Faucetts & Son
  - West Chester ..........Harper Creamery
  - West Chester.............Wm. B. Harvey
  - West Chester.......Homestead Creamery
  - West Chester....West Chester Creamery
  - West Chester.........West Chester Dairy
  - West Chester........E. Roberts' Creamery
  - Whitford .............Whitford Creamery
  - Whitford................Arnold M. Wilber
  - Williams' Corners .....Charles Buckwalter
  - Williams' Corners........Morris Mackissic
  - Willowdale .......... Willowdale Creamery
  - Wrightsdale .......Wrightsdale Creamery
- Crawford Co.
  - Beaver Centre..............Clark & Gates
  - Conneautville .....................J. W. Clark
  - Centreville ..........Centreville Creamery
  - Beaver Centre..........Green, Clark & Co.
  - Crossingville .....Crossingville Creamery
  - Dicksonburg ......................T. S. Laver
  - Espyville ..........................A. W. Wall
  - Frenchtown .............Augustus Polley
  - Guys Mills.......................L C. McGaw
  - Jewell .......Jewell Cheese Factory Co.
  - Jewell...........................N. O. Stanford
  - Hickernell ..........Hickernell Creamery
  - Lincolnville .........Lincolnvile Creamery
  - Linesville ......................A. B. Griffin
  - Long's Stand.......................A. J. Miller
  - Meadville....Leon C. McGraw Cheese Co.
  - Miller's Station.............L. C. McGraw
  - Penn Line..................L. C. McGraw
  - Pinney Corners..............D. H. Nodine
  - Rundell's ..................McGaw & Cooper
  - Saegerstown ......................A. B. Long
  - Saegerstown ..............Long & Reiche
  - Spartansburg ..........Concord Creamery
  - Spartansburg ..............Hyde & Baker
  - Springboro ....................J. J. Howard
  - Townville .......................A. L. Squier
  - Troy Centre...........Grove & McDowell
  - Troy Centre........Troy Centre Creamery
  - Westford ...........................J S. Martin

Westford .......................Hart Espy
Woodcock ...............Sherrod & Norris
Clarion Co.
Callensburg ........Callensburg Creamery
Lickingville..........Pioneer Creamery Co.
Marble ..............Enterprise Creamery
Newmansville ......Pioneer Creamery Co.
Clearfield Co.
Clearfield ........Clearfield Creamery Co.
Clearfield .................James Mitchell
Clinton Co.
Clintondale .....Clintondale Creamery Co.
Loganton .............Loganton Creamery
Salona ...................Salona Creamery
Columbia Co.
Berwick ..............Fairview Creamery
Millville ...............Millville Creamery
Cumberland Co
Allen ....Cumberland Valley Creamery Co.
Allen .........................John Hoemer
Boiling Springs ..........Wm. H. Kunkel
Carlisle ..................Letort Creamery
Craighead ..................B. W. Hasler
Hatton ..............Keystone Creamery
Mechanicsburg,
Cumberland Valley Creamery Co.
Mechanicsburg ..Mechanicsburg Creamery
New Kingston
Cumberland Valley Creamery
Newville ...........Big Springs Separator
Shippensburg...........B. D. Biggs & Son
Shippensburg ................Jacob Reigle
Williams' Mills
Cumberland Valley Creamer Co.
Williams' Mills ...........Geo. Umberger
Dauphin Co.
Berrysburg ..................Peter L Stine
Deodate .......................Ezra C. Foltz
Fisherville ...............Cornelius Bixler
Fisherville ..........Fisherville Creamery
Grantville ................Stauffer & Rapp
Harrisburg ......................S. F. Barber
Hummelstown ............Model Creamery
Millersburg ......................C. F. Moyer
Powl's Valley ............C. Bixler & Son
Progress ..................John H. Sheesley
Swatara ..............Conewago Creamery
Union Deposit ............Stauffer & Rapp
Delaware Co.
Brandywine Summit ..Miller & Heyburn
Chadd's Ford........E. Darlington & Bro.
Cheney ....................Thomas Cheney
Cheney .................Frank G. Thomas
Concordville ..............P. E. Sharpless
Darling .............Darlington Creamery
Darlington........M. F. Darlington & Son
Villanova ..............Villanova Creamery
Wallingford ........Wallingford Creamery
Wallingford ........Wallingford Dairy Co.
Ward.............. Pennock E. Sharpless
Elk Co.
Ridgway...........Ridgway Creamery Co.
St. Mary's ..........St. Mary's Creamery
Erie Co.
Albion ..........................W. S. Boyle
Corry .......................Corry Creamery
Corry ............................J. C. Wales
Edinboro ...................Lavery & Co.
Elgin ..........................Pier Willard
Ferdinand......W. Union Cheese Factory
Franklin Corners ..........Frank Billings
Greenfield..Greenfield Butter & Cheese Co.
Ivasea .........Population Cheese Factory
Itley ........................William Marsh
Juva ..................Barnes & Lockwood
Lavery ............................J. S. Lavery
LeBoeuf.......................C. M. Wheeler
Lovell's Station .........Crowells McCray
Loysville .......Dickinson, Gilbert & Keen
McLane .......................Wm. Marsh
Mystic ....................J. H. Waterhouse

Ovid ........................Mark L. Howard
Phillipsville ....................Alfred Moore
Pont ..............................R. B. Gates
Sterrettania ..............Joseph H. Hauch
Sterrettania ........Sterrettania Creamery
Tellar ........................C. D. Faulkner
Union City ..................Geo. W. Carroll
Wattsburg .................F. W. Edmunds
Wattsburg ........Keystone Creamery Co.
Waterford .................Sharps Creamery
Waterford .............Vananden & Gillet
Waterford ........................J.H. Brogdon
Wattsburg .........................Pratt Bros.
Waterford .............Vananden & Gillit
Waterford ............................O. H. Wells
Fayette Co.
East Riverside ..............M. R. Jacobs
Farmington ................Cheese Factory
New Haven ........New Haven Butter Co.
Franklin Co.
Chambersburg .........Hanover Creamery
Chambersburg ...Chambersburg Creamery
Edenville ..........Franklin Creamery Co.
Green Castle ....................F. W. Kulin
Green Village ..............H. Fogelsange
Green Village ......Green Village Creamery
Lemaster's ........J. R. Lemaster & Son
Marion
Cumberland City Creamery and Dairy
Markes ............J. R. Lemaster & Son
Mercersburg ..Mercersburg Creamery Co.
Shady Grove ..Nicodemus Creamery Assn.
Waynesboro ....Blue Mountain Creamery
Waynesboro ................A. L. Schaller
Waynesboro ............Chas. H. Stickell
Williamson
Williamson Farmers' Co-operative Cream
Williamson .....Williamson Creamery Co.
Willow Hill .............McCurdy & Elder
Fulton Co.
McConnellsburg ...............W. L. Sloan
McConnellsburg ..McConnellsburg Cream.
Greene Co.
Carmichaels .......Carmichaels Creamery
Huntingdon Co.
McAlevey's Fort McAlevy's Fort Creamery
Morrell ......Morrell Butter & Cheese Co.
Neff's Mills ........Neff's Mills Creamery
Pennsylvania Furnace ....Hoffman Bros.
Indiana Co.
Elder's Ridge..Co-oprative Creamery Co.
Homer City ................H. C. English
Homer City ........Homer City Creamery
Jefferson Co.
Sugar Hill ............J. N. Atwell & Co.
Juniata Co.
Cocolamus ....................Brown & Co.
East Salem .......................S. Schlegal
East Salem ........East Salem Creamery
McAllistersville
Shellenberger & Hambright
McCoysville ...............B. C. Cubbelson
Mifflintown ................J. G. Haldeman
Port Royal .........Port Royal Creamery
Thompsontown ............J. G. Haldeman
Lackawanna Co.
Glenburn ..................Enderly Dairy
La Plume ............Scranton Creamery
Moscow ...............Moscow Creamery
Scranton ...........................Wm .Conrad
Scranton .........................E. S. Decker
Lancaster Co.
Bainbridge ...............Coday Creamery
Bart ............................Bart Creamery
Bethesda ..............Bethesda Creamery
Bird-in-hand ......Bird-in-hand Creamery
Bird-in-hand ......................F. Bowman
Blue Ball ................S. H. Musselman
Buck ...........................Buck Creamery
Cambridge ..........Cambridge Creamery
Cambridge .........E. J. & P. H. Emery

Cambridge ................George I. Emery
Christiana ...........Christiana Creamery
Cocalico ..................Cocalico Creamery
Colemanville ...............George Garret
Collens .......................Herr & Maull
Denver ........................Daniel Gebble
Elizabethtown ...Elizabethtown Creamery
Ephrata ............................J H. Yeiser
Fairland ............................John Reist
Farmersville ............Henry J. Shaffer
Fertility ...........Fertility Creamery Co.
Florin .......................Florin Creamery
Furniss ..............................C. P. Grigg
Gap ...............Gap Creamery Co. Ltd.
Glenola ............Johnsonville Creamery
Glenola ......................H. M. Stauffer
Goshen ...............The Elam Dairy Co.
Goshen ...................Goshen Creamery
Goshen ........................Amos Walton
Hahnstown ...............John Fry's Sons
Kirkwood .............................Ezra Hess
Kirkwood ...................Graybill Stone
Lancaster ............Lancaster Dairy Co.
Landisville ................Levi H. Hershey
Landisville ..........Landisville Creamery
Lititz ...................Garber Reist & Co.
Manheim ......................Hershey Bros.
Martillville ...................M. C. Eshelman
Mascot ...............Stumptown Creamery
Mastersonville ....Farmers' Creamery Co.
Mastersonville
Mastersonville Creamery Assn.
May .......................Johnson & Gilbert
McSparran ........Peters' Creek Creamery
McSparran ..........Willowdale Creamery
Mt. Joy ..........Farmers' Creamery Co.
Mt. Joy ...............Reist, Nissley & Son
Mount Nebo ....Mt. Nebo Creamery Assn.
New Providence ......Dickinson & Gilbert
Octoraro ........................J. H. Brosius
Pleasant Grove ............Carter & Mills
Pleasant Grove ......Conowingo Creamery
Quarryville ...........Dickinson & Gilbert
Quarryville ..........Quarryville Creamery
Reinhold Station..Reinhold Station Cream.
Smithville ........Harry S. Wiggling & Co.
Smyrna ............Smyrna Creamery Co.
Spruce Grove .........................M. Keech
Spruce Grove ...............Milton Keech
Unicorn ...................Unicorn Creamery
Unicorn ............................J. E. Moore
White Rock ............Elm Creamery Co.
White Rock ...............Wm. G. Patton
White Rock ....White Rock Creamery Co.
Windom .........Champion Creamery Co.
Lawrence Co.
Enon Valley ......Enon Valley Creamery
Neshannock Falls
Neshannock Falls Creamery
New Castle ............Midway Butter Co.
Pulaski .........................John S. Evans
Volant ..........................J. Wilken & Son
Lebanon Co.
Bellegrove ..........Cleona Creamery Co.
Campbellstown ..Campbellstown Creamery
Cleona .............Cleona Creamery
Fontana ............Cleona Creamery Co.
Fredericksburg ............L. S. Gearhart
Jonestown ..................Z. T. Gingrich
Lawn ..................Lawn Creamery Co.
Lebanon .......................City Creamery
Millbach ..........Millbach Creamery Co.
Myerstown ...............Basler Creamery
Myerstown ............George W. Donges
Myerstown ..................Mengle & Yost
Ono ...............................L. S. Gerhart
Palmyra ....Elizabethtown Creamery Co.
Prescott ...........................Henry Haak
Richland Station
Big Spring Creamery Co.
Richland Station ........G. E. Brownback

Richland Station ..............Henry Haak
Lehigh Co.
Alburtis ......Spring Creek Creamery Co.
Allentown ........Spring Creek Creamery
Allentown .............Loux Creamery Co.
Catasauqua ........Howertown Creamery
Coopersburg ............W. H. Steininger
Coopersburg ..................Landis & Co.
Hosensack ................L. H. Brownell
Hosensack ..........Hosensack Creamery
Lanark .........................J. C. Richard
Lyon Valley ........Lyon Valey Creamery
Lyon Valey ..................M. C. Rollman
Macungie ...............E. M. Laux & Co.
Macungie ............Macungie Creamery
Macungie .......................Schuler Bros.
New Tripoli ..............Miller & Gilmer
Plover ..........................W. R. Schuler
Sigmond ...............Jacob Faust & Co.
Steinsville ...........Steinsville Creamery
Vera Cruz .......................Schuler Bros.
Vera Cruz ..........Vera Cruz Creamery
Wanamaker ............John K. Fetherolf
Werley's Corner ............O. P. Werley
Luzerne Co.
Hazleton ....................Rhone Trescott
Hazelton .......................J. M. Williams
Wilkesbarre .....Standard Dairy Co. Ltd.
Wapwallopen
Wapwallopen Co-operative Creamery Co.
Lycoming Co.
Jersey Shore ...............J. M. Harmon
Larrys Creek ...............Geo. L. Randall
Muncy ........................David Gundsum
Muncy ........................Muncy Creamery
Roaring Branch ..............E. E. Harrer
Roaring Branch ..American Creamery Co.
McKean C.
Eldred ...............Eldred B. & C. Co.
Kane ...............Kane Creamery Co.
Myrtle ..........................R. G. Wooden
Port Allegany ........Acme Creamery Co.
Smethport
Naundah Butter & Creamery Co.
Mercer Co.
Greenville ........Greenville Creamery Co.
Grove City .......Library Grove City Coll
Grove City .......................A. H. Beatty
Indian Run ...................T. P. Munnell
Jamestown .......................W. R. Plant
London ..............London Creamery Co.
Mercer ..............Louden Creamery Co.
Mercer ...........McDonaldson & Zahiser
Mercer ..........Mercer Creamery Co Ltd.
New Vernon ....................J. A. Carey
Sharpsville ..........Sharpsville Creamery
Volant ...........................S. A. Williams
Mifflin Co.
Allensville ........Allensville Creamery Co.
Belleville ..............Belleville Creamery
Mattawana .........Mattawana Creamery
McVeytown ............John M. Hassinger
Reedsville ......................D. Z. Detweiler
Reedsville ......................A. L. Detweiler
Reedsville ..............Reedsville Creamery
Monroe Co.
East Stroudsburg
Beechpond Creamery Co.
Gilbert..............................M. G. Funk
Lamartine ...........Salem Creamery Co.
Limestone ............Greenville Creamery
Stroudsburg ....Stroudsburg Creamery Co.
Montour Co.
Washingtonville ......Mengle & Luckenbill
Montgomery Co.
Cedars ............................J. P. Bustard
Colmar ....................Colmar Creamery
Colmar ...............................John Holley
Congo ......................Congo Creamery
Creamery ...Perkiomen Dairymen's Assn.
Earlington .....................H. C. Durstine

Earlington ................J. G. Hunsicker
Earlington ....................John Landis
East Greenville ....East Greenville Cream.
East Greenville ..............Adam Kraus
Fairview Village
Fairview Village Creamery Assn.
Franconia ....................J. N. Freed
Franconia .........Indian Creek Creamery
Franconia ................John K. Landis
Frederick ...........Green Tree Creamery
Grater's Ford ........ ..........A. G. Fly
Grater's Ford ...Grater's Ford Cream. Co.
Hatfield ..........Drake's Ford Creamery
Hatfield .....................Aaron Tyson
Hillegas ...........Hillegas Creamery Co.
Hoppenville ...........McLean's Creamery
Hoppenville ....................J. T. Moyer
Iron Bridge ....Harmony Grange Creamery
Kulpsville ....Towamensing Creamery Co.
Lederachsville .........Andrew T. Garber
Lederachsville ....Wide Awake Creamery
Lederachsville .......Worcester Creamery
Limerick ...........Garret E. Brownback
Limerick ...........Samuel Y. Eisenberg
Linfield ..................G. E. Brownback
Linfield .............Samuel Y. Eisenberg
Linfield ...................P. J. Reifsnyder
Lucon ..................Lucon Creamery Co.
Mainland .........Mainland Creamery Co.
Narcissa ......Plymouth Valley Creamery
North Wales .............C. W. Hoffman
Obelisk .....Green Tree Dairymen's Assn.
Perkiomenville .................J. M. Reed
Pottstown ......................S. G. Fly
Pottstown ..........Miller Bros. Creamery
Prospectville ..Prospectville Creamery Co.
Royersford ...............Mingo Creamery
Salfordville ......Upper Salford Creamery
Sanatoga ..............Sanatoga Creamery
Sassmansville Sassmansville Creamery Co.
Schwenksville ............William Bromer
Schwenksville .Dairymen's Creamery Assn.
Schwenksville ............Wm. G. Liegler
Skippack ........Schwenksville Cry. Assn.
Spring House .................R. R. Jones
Trappe ...........Spring Valley Creamery
Willow Grove ....Willow Grove Creamery
Worcester ......Farmers' Creamery Assn.
Yerkes .....................Yerkes Creamery
Northampton Co.
Bath ..........................W. H. Landis
Benningers .......W. M. Benninger & Son
Bingen ...................Campbell & Appel
Bushkill Centre ..Bushkill Centre Cream.
Butztown .............Butztown Craemery
Cherryville ...................L. D. Meckley
Hecktown ...........Hecktown Creamery
Hecktown ....................W. H. Landis
Hecktown ....................S. D. Steuben
Moorestown ...................H. S. Kratz
Nazareth .......................H. S. Kratz
Nazareth ..........Nazareth Creamery Co.
Petersville ................William A. Slot
Plainfield ..............Plainfield Creamery
Stockertown ........Stockton Creamery Co.
Stone Church ...........W. M. Benninger
Stone Church ............Jordon McIntyre
Walnutport .............W. M. Benninger
Weaversville ..............Dairmen's Assn.
Weaversville ...........William M. Smith
Youngs .......................Frank Young
Northumberland Co.
Chillisquaque .................C. L. Butler
Dewart .............Dewart Creamery Co.
Milton ......Pleasant Valley Creamery Co.
Montandon ..........Cold Spring Creamery
Sedan ............................Wm .Dunn
Sunbury ................Chas R. Rinehart
Sunbury ..........Sunbury Creamery Co.
Perry Co.
Elliottsburg ...................E. J. Kistler
Loysville ..........Loysville Creamery Co.
Millerstown ......................J. C. Kipp
Pike Co.
Matamoras .........Matamoras Creamery
Potter Co.
Bingham Centre ..............W. J. Clark
Bingham Centre ..............R. H. Howe
Bingham Centre ............Richard Labor
Elmer ......................Cheese Factory
Newfield .....................W. J. Grover
Raymonds ..................E. J. Conable
Raymonds ..................W. B. Perkins
White's Corners ...White' Corners Cream.
Schuylkill Co.
Orwigsburg ..................A. F. Kimmel
Rauch's ....................Salem W. Koch
Tamaqua .............Henry M. Enterline
Snyder Co
Beaver Springs ....Beaver Springs Cream
Globe Mills ........Palmer & Hackenburg
McClure ........................Ulsh & Bro
Middlebrug ........Palmer & Hackenburg
Susquehanna Co.
Alford ....................Alford Creamery
Auburn Centre
Shannon Hill Co-Op. Creamery
Auburn 4 Corners
Auburn 4 Corners Creamery Co.
Birchardville ....................C. P. Ball
Birchardville ......Birchardville Creamery
Birchardville .....Excelsior Creamery Co.
Brooklyn ..............Brooklyn Creamery
Choconut ..Choconut Valley Creamery Co.
Dimock .............Dimock Creamery Co.
East Rush ......East Rush Creamery Co.
East New Milford
Mountain Lake Creamery Co.
Fairdale ..........................C. P. Ball
Fairdale ................Fairdale Creamery
Fairdale .......................Seller Bros.
Forest Lake...Forest Lake Creamery Co.
Franklin Forks ....Franklin Forks Cream.
Gibson ................Hartford Dairy Co.
Heartlake ............Heartlake Creamery
Harford ................Harford Dairy Co.
Hop Bottom
Hop Bottom Dairy & Milk Co.
Hop Bottom ........Hop Bottom Creamery
Kingsley ......Kingsley Creamery Co Ltd.
Kingsley .......Kingsley Union Creamery
Kingsley..Robinson Wollworth & Kingsley
Lawesville Centre
Lawsville Co-Op. Creamery Co.
Little Meadows .....Iron Bridge Creamery
Little Meadows .Little Meadows Creamery
Middletown ....Iron Bridge Creamery Co.
Middletown Centre
Middletown Centre Creamery Co.
Montrose ............Montrose Dairy Co.
Montrose .......................Seller Bros.
Montrose .......................Beech Bros.
Montrose ..................Beebe Creamery
Montrose .........Montrose Creamery Co.
Montrose ...........Silver Lake Creamery
New Milford .......Kingsley Creamery Co.
New Milford ...New Milford Creamery Co.
Rush ..........Rush Centre Creamery Co.
Rushboro ........................ Treasurer
Rushboro .......Jersey Hill Creamery Co.
Rushboro ........East Rush Creamery Co.
Rushville .........Rushville Creamery Co.
Silver Lake .......Quaker Lake Creamery
Springville ...........Springville Creamery
South Gibson ..........Hartford Dairy Co.
Tiffany .................Tiffany Creamery
Thompson ..........Thompson Creamery
Tioga Co.
Austinburg ......................E. A. Bean
Austinburg ................Cheese Factory
Balsam ...........Balsam Cheese Factory
East Chatham ..................D. Avery

Elkland ................Elkland Creamery
Elkland ...................Cheese Factory
Job's Corners .......William G. Carpenter
Keenyville ........................A. C. Close
Keenyville ...................Cheese Factory
Knoxville ........................E. A. Dean
Knoxville ....Pennsylvania Creamery Co.
Knoxville ...................Cheese Factory
Lawrenceville ....Lawrenceville Creamery
Liberty ........................Worlin Miller
Liberty ....Liberty Valley Creamery Co.
Little Marsh ...............W. Wass & Co.
Little Marsh ...............Cheese Factory
Mansfield.....................Pitts & Spurr
Mansfield ........West Sullivan Creamery
Nelson .....................J. B. Campbell
Nelson ...........Nelson Cheese Factory
Nelson ....Nelson Separator & Butter Co.
Round Top .......................E. A. Close
Rutland ....................Zimmer & Clark
Stony Fork .........Stony Fork Creamery
Sylvester ........................E. O. Bean
Tioga .........................Kemp & Berg
Tioga .................Tioga Cheese Factory
Wellsboro .......................G. B. Close
Westfield .......Westfield Cheese Factory
Union Co.
Lewisburg .......Buffalo Valley Creamery
Mifflinburg ......Crystal Springs Creamery
Mifflinburg .....Mifflinburg Creamery Co.
Venango Co.
Oil City .....................M. B. Crowther
Warren Co.
Ackley Station ............Young & Clark
Bear Lake ...............Frank Parkhurst
Chandlers' Valley ........Valley Creamery
Columbus ........................J. U Wells
Garland ..........Garland Cheese Factory
Grand Valley ............Valley Creamery
Lander ........................James Curtis
Lander ..........................E. S. Griggs
Lottsville .........................Vern Grigg
Spring Creek ........Willowdale Creamery
Sugar Grove ..........Acme Creamery Co.
Sugar Grove ............George Hampson
Youngsville ....Youngsville Creamery Co.
Washington Co.
Bulger ........................Peter Hermes
Bulger ......Ohio & Pgh. Milk Co.'s Cr'y
West Alexander ..McCalmont & Chambers
West Alexander ..Jas. A. Chambers & Co.
Wayne Co.
Ariel ...................Lakeside Creamery
Beach Lake ........Beach Pond Creamery
Clemo ..............Clemo Creamery Co.
Gravity ........Gravity Co-Op. Creamery
Gravity ............Georgetown Creamery
Honesdale ........Crystal Spring Creamery
Newfoundland .......Hopedale Co-Op. Co.
Sulleyville ....................G. & C. Smith
Seeleyville ....Silver Creek Creamery Co.
Starlight ..............Starlight Dairy Co.
Westmoreland Co.
Greensburg ..................Chicago Dairy
Mt. Pleasant ......Mt. Pleasant Creamery
New Kenington
New Kensington Butter Co.
New Kensington ..........Willis Wonderly
Scott Haven .............McGrew & Bros.
Smithton .............Smithton Creamery
Wyoming Co.
Factoryville ........Factoryville Creamery
Factoryville ..................V. R. Gardner
Laceyville ..........Horseheads Creamery
Laceyville ......Bradford Co. Creamery Co.
Lemon ....................Lemon Creamery
Nicholson ............Nicholson Creamery
Nicholson .........................L. H. Pratt
Nicholson ..............Lackawanna Dairy
North Mehoopany ...........Vaughn Bros.
York Co.
Big Mount ...................A. B. Mummert
Bridgeton ............Bridgeton Creamery
Brodbecks ......Brodbecks Sta. Creamery
Brodbecks ...................Miller &Bortner
Delta ...............Daniel Hollingsworth
Dillsburg ..................Dillsburg & Elgin
Dover ......................Dover Creamery
East Berlin .........East Berlin Creamery
Felton ....................R. Grove & Brother
Gatchellville .......Gatchellville Creamery
Glennville .............Gennville Creamery
Hanover ................Hanover Creamery
Hanover ........York & Adams Creamery
Hanover ............Reist, Nissley & Co.
Hanover ............Hanover Produce Co.
Muddy Creek Forks
Pleasant Grove Creamery
New Freedom ............August J. Gillen
New Park ...........New Park Creamery
New Sinsheim ...........Israel K. Zeigler
Porter's Siding ..............C. C. Wooden
Railroad .......................J. A. Wetrick
Shrewsbury ........Shrewsbury Creamery
South Beaver St. York ........Mr. Budd
Spring Forge ..........Wagner & Swartz
Slate Hill ....Cool Spring Creamery Co.
Slab ...................C. C. Smith & Bro.
Swartstown ........Swartstown Creamery
Wellsville .......................T. C. Cleaver

# WHAT WE BREED

## PURE BRED STOCK BRED BY MEMBERS OF THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

## HORSES.

### ARABS.

Name. Postoffice. County.
Herman Hoopes............Westchester, Chester

### MORGANS.

A. R. Van Tassel............DuBois, Clearfield
Geo. A. Hogg.......24th & R. R. Sts., Pittsburg
M. B. Stephens...............Dilltown, Indiana
R. F. Shannon.......Edgeworth Sta., Allegheny

### CLEVELAND BAY.

Powell Bros...............Shadeland, Crawford

### FRENCH COACH.

Powell Bros...............Shadeland, Crawford
Julius Le Moyne........Washington, Washington

### CLYDESDALE.

Powell Bros...............Shadeland, Crawford

### FRENCH DRAFT.

Powell Bros...............Shadeland, Crawford

### SUFFOLK PUNCH.

Powell Bros...............Shadeland, Crawford

### BELGIAN.

Powell Bros...............Shadeland, Crawford
Lyman Hunter.............Hartstown, Crawford

### STANDARD-BRED.

Benj. McKeehan.........Mt. Rock, Cumberland
W. C. Norton.................Waymart, Wayne
Homer Bros..................Greenville, Mercer
. Blair (Carriage type)...Hartstown, Crawford
Henry Palmer................Avondale, Chester
zra Michener.................Michener, Bucks
Powell Bros................Shadeland, Crawford
W. E. Stevenson......Burgettstown, Washington
J. M. Main & Sons....Shippensburg, Cumberl'd
D. H. Waite........Warrior's Mark, Huntingdon
W. H. Ridge....................Trevose, Bucks

### SHIRE.

Sam'l McCreary................Volant, Lawrence
Wm. L. Christley.........Slippery Rock, Butler
Geo. A. Hogg......24th & R. R. Sts., Pittsburg
Powell Bros.................Shadeland, Crawford

### PERCHERONS.

D. S. Kloss........................Tyrone, Blair
A. M. Dickson & Son......Cochranton, Crawford
E. B. Boyle...........Canonsburg, Washington
J. M. Main & Sons.....Shippensburg, Cumberl'd
Geo. A. Hogg.......24th & R. R. Sts., Pittsburg
W. A. McCoy & Sons............Mercer, Mercer
Powell Bros................Shadeland, Crawford
Lyman Hunter.............Hartstown, Crawford
Wm. F. Gable.................Wyebrook, Chester
John W. Burket......................Tyrone, Blair
W. M. Lyon & Son.........Wyalusing, Bradford

### THOROUGHBREDS.

R. S. Hartley.................Youngsville, Warren

### HACKNEYS.

Geo. A. Hogg.......24th & R. R. Sts., Pittsburg
Powell Bros................Shadeland, Crawford
Lyman Hunter.............Hartstown, Crawford

### SHETLAND PONIES.

Wm. F. Gable..............Wyebrooke, Chester
W. M. Thompson............Uniontown, Fayette
F. B. Stewart..............Espyville, Crawford
Powell Bros................Shadeland, Crawford

## CATTLE.

### ABERDEEN-ANGUS.

W. H. Rink................Johnstown, Cambria
W. L. Christley...........Slippery Rock, Butler
Jas. Blair..................Hartstown, Crawford
Bayard Bros...............Waynesburg, Greene
Penn'a State College.......State College, Center
Geo. Black..................Dayton, Armstrong
Lyman Hunter.............Hartstown, Crawford

### AYRSHIRES.

Willis W. Hopkins...........Aldenville, Wayne

### BROWN SWISS.

R. I. Young...............Middletown, Dauphin
W. H. H. Riddle..................Butler, Butler

### DEVONS.

B. F. Jones..............South Montrose, Susq.
A. S. Worden.....................Frederick, Md.
J. Cheston Morris..........Westchester, Chester
Powell Bros...............Shadeland, Crawford

### POLLED ALBIONS.

B. E. Ferris.......................Hector, Potter

### HOLSTEINS.

W. T. Suter..........Riverside, Northumberland
Sam'l McCreary...............Volant, Lawrence
H. M. Lyon & Sons.......Wyalusing, Bradford
J. B. Henderson......Burgettstown, Washington
B. F. Jones.............South Montrose, Susq.
A. S. Worden....................Frederick, Md.
Geo. G. Paxton............Houston, Washington
W. E. Stevenson......Burgettstown, Washington
D. S. Kloss.......................Tyrone, Blair
J. M. Quivey & Sons......Houston, Washington

J. M. Paxton..............Houston, Washington
Powell Bros...............Shadeland, Crawford
D. E. Notestine..............Lewistown, Mifflin
Nelson Poorbaugh...Mt. Pleasant, Westmoreland

### POLLED DURHAMS.

D. C. Andrews.........West Newton, Westm'd
Lee R. Scott.........Burgettstown, Washington
Chas. Buchanan.................Utica, Venango
J. C. Mattern & Sons......Hollidaysburg, Blair

### RED POLLS.

B. E. Ferris.....................Hector, Potter
N. O. Brownlee...........Crothers, Washington
A. M. Dickson & Son....Cochranton, Crawford
D. Norman App............Selinsgrove, Snyder
John F. Zook..................Belleville, Mifflin
Sidney F. Isett......Spruce Creek, Huntingdon

### SHORTHORNS.

C. A. Hershey..............Gettysburg, Adams
W. M. Thompson...........Uniontown, Fayette
F. N. Hubbard.....................Troy, Bradford
John A. Cummins..........Waynesburg, Greene
Geo. G. Strosnider.........Waynesburg, Greene
G. D. Walker...................Salona, Clinton
J. L. Stouffer.........Southwest, Westmoreland
Jos. T. Fleming...............Belleville, Mifflin
W. J. Monroe........Greensburg, Westmoreland
W. C. Black.....................Mercer, Mercer
B. L. Post's Sons.......West Alexander, Wash.
A. S. Eagleson & Sons.......Washington, Wash.
L. Douthett................Thornhill, Allegheny
W. A. McCoy & Sons............Mercer, Mercer
Lee R. Scott.........Burgettstown, Washington
Penn'a State College.......State College, Center
A. G. Shaffer..........Rural Valley, Armstrong
L. D. May...........Granville Center, Bradford
R. C. Vance.........Burgettstown, Washington
R. L. Munce...........Canonsburg, Washington
D. H. Waite........Warrior's Mark, Huntingdon
E. B. Boyle............Canonsburg, Washington

### GUERNSEYS.

T. M. McKee.................Lewistown, Mifflin
Penn'a State College.......State College, Center
J. E. Woodmansee..........Lake Como, Wayne
Nelson Poorbaugh........Mt. Pleasant, Westm.
Wm. F. Gable.............Wyebrooke, Chester
R. S. Hartley..............Youngsville, Warren
Irwin F. McKee........Washington, Washington
H. H. Snavely.........Willow Street, Lancaster
Wm. Thompson, Jr..............Lemont, Center
Geo. G. Paxton...........Houston, Washington
J. H. Peachy...................Belleville, Mifflin
H. C. Bughman......Greensburg, Westmoreland
R. F. Shannon........907 Liberty St., Pittsburg
Henry Palmer................Avondale, Chester
Ezra Michener.................Michener, Bucks
H. W. Comfort..............Fallsington, Bucks
R. S. Love.........Mt. Pleasant, Westmoreland
Shook Bros...............Spring Mills, Center

### JERSEYS.

Jas. I. Thompson................Lemont, Center
Chas. A. Porter........Torresdale, Philadelphia
Ludwig S. Filbert.......Fox Chase, Philadelphia
Geo. S. Barnhart.....Greensburg, Westmoreland
R. I. Young.................Middletown, Dauphin
Geo. Erk.......................Seelyville, Wayne
B. W. McKeehan.........Mt. Rock, Cumberland
A. L. Martin.................Harrisburg, Dauphin
Edward Walter...........West Chester, Chester
A. P. Warren................Elizabeth, Allegheny
Jas. H. Cowan.............Duquesne, Allegheny
J. M. Main & Sons.....Shippensburg, Cumberl'd
John B. Kepple........Greensburg, Westmorel'd
W. F. Shrum........Adamsburg, Westmoreland
M. P. Shoemaker & Bro.....Greensburg, West.
G. H. Knapp...................Aldenville, Wayne
L. W. Lighty..............East Berlin, Adams
R. S. Hartley..............Youngsville, Warren
J. I. Barley............Baker's Summit, Bedford
W. E. & J. J. Perham.........Niagara, Wayne
W. C. Norton...................Waymart, Wayne
S. E. Nivin................Landenburg, Chester
A. T. Replogle.............Waterside, Bedford
Austin Leonard & Son..........Troy, Bradford
W. F. Wagner......Harrison City, Westmorel'd
Clarence M. Glasgow.......Calvin, Huntingdon
Herman Hoopes............Westchester, Chester
W. W. Harrison....119 N 11th St., Philadelphia
R. F. Shannon........907 Liberty St., Pittsburg
Henry H. Randt.............Pipersville, Bucks
J. B. Wylie..........Washington, Washington
W. F. McSparran............Furniss, Lancaster
E. B. Boyle...........Canonsburg, Washington
J. H. Silvis..........Greensburg, Westmoreland
M. E. Reeder...............Muncy, Lycoming
T. M. Shively...............Mifflinburg, Union
J. A. Sheerer.........................
T. A. Scheirer...............Slatington, Lehigh

## SWINE.

### BERKSHIRES.

J. N. Glover..................Vicksburg, Union
A. S. Worden.....................Frederick, Md.
R. W. Crothers & Son......Taylorstown, Wash.
Geo. W. Mellotte...................Lisbon, Ohio
Edward Walter...........Westchester, Chester
J. M. Main & Sons.....Shippensburg, Cumberl'd
Nelson Poorbaugh........Mt. Pleasant, Westm'd
Sam'l McCreary..............Volant, Lawrence
Jas. L. Henderson.....Washington, Washington
L. W. Lighty..............East Berlin, Adams
A. H. Erdman.............Wiconisco, Dauphin
J. B. Henderson......Burgettstown, Washington
John A. Cummins..........Waynesburg, Greene
G. D. Walker...................Salona, Clinton
Ralph Minner & Sons............Mercer, Mercer
J. Cheston Morris.........Westchester, Chester
T. M. Shively..................Mifflinburg, Union
W. C. Black.......................Mercer, Mercer
Homer Bros.....................Greenville, Mercer
H. C. Bughman......Greensburg, Westmoreland
R. F. Shannon............Pittsburg, Allegheny
A. S. Eagleson & Sons......Washington, Wash.
N. O. Brownlee...........Crothers, Washington
S. V. McDowell & Son.........Fredonia, Mercer
W. F. McSparran............Furniss, Lancaster
J. M. Paxton.............Houston, Washington
W. F. Holtzer............Greensburg, Westm'd
W. H. Gray...............Brookville, Jefferson
D. H. Waite........Warrior's Mark, Huntingdon
T. J. Erdley................Lewisburg, Union

### DUROC-JERSEYS.

Wm. Thompson, Jr.............Lemont, Center
B. L. Post's Sons.......West Alexander, Wash.
George Black................Dayton, Armstrong
S. S. Blyholder...............Neale, Armstrong
D. E. Notestine..............Lewistown, Mifflin
Sidney F. Isett...................Spruce Creek

### CHESTER WHITES.

G. S. Barnhart.......Greensburg, Westmoreland
H. M. Lyon & Sons........Wyalusing, Bradford
J. C. Mattern & Sons.......Hollidaysburg, Blair
R. L. Munce...........Canonsburg, Washington
Edward Walter............Westchester, Chester
A. P. Warren...............Elizabeth, Allegheny
J. E. Woodmansee..........Lake Como, Wayne
Benj. McKeehan.........Mt. Rock, Cumberland
W. F. Gable...................Wyebrooke, Chester
H. M. Lyon & Sons........Wyalusing, Bradford
Willis W. Hopkins...........Aldenville, Wayne
F. W. Levis............Chadd's Ford, Chester
A. T. Replogle..............Waterside, Bedford
Jos. T. Fleming................Belleville, Mifflin
W. J. Monroe.......Greensburg, Westmoreland
D. S. Kloss.......................Tyrone, Blair
Sidney F. Isett.......Spruce Creek, Huntingdon

W. A. McCoy & Sons...........Mercer, Mercer
A. M. Dickson & Son (O I C)
Cochranton, Crawford
S. V. McDowell & Son.........Fredonia, Mercer
D. W. Jones...............Wilmore, Cambria
J. H. Silvis..............Greensburg, Westm'd
J. N. Glover..................Vicksburg, Union
E. B. Boyle............Canonsburg, Washington
T. M. McKee...............Lewistown, Mifflin
R. C. Vance...........Burgettstown, Washington

### OZARK OR MULE FOOT HOGS.

A. M. Dickson & Son....Cochranton, Crawford

### POLAND-CHINAS.

J. C. Mattern & Sons.......Hollidaysburg, Blair
D. Norman App............Selinsgrove, Snyder
A. G. Shaffer...........Rural Valley, Armstrong
A. P. Warren..............Elizabeth, Allegheny
Edward Walter............Westchester, Chester
C. A. Hershey..............Gettsyburg, Adams
W. F. Wagner....Harrison City, Westmoreland
J. L. Stouffer..........Southwest Westmoreland
Burns & Adams............Imperial, Allegheny
J. H. Peachey.................Belleville, Mifflin
T. M. McKee................Lewistown, Mifflin
R. S. Love.........Mt. Pleasant, Westmoreland
T. M. Shively.................Mifflinburg, Union

## SHEEP.

### BLACKTOP MERINOS.

John M. Berry........Wylandville, Washington
R. P. Berry............Eighty-four, Washington
R. L. Munce............Canonsburg, Washington
E. B. Boyle............Canonsburg, Washington

### DELAINE MERINOS.

Geo. G. Paxton...........Houston, Washington
Lee R. Scott.........Burgettstown, Washington
E. B. Boyle...........Canonsburg, Washington
B. L. Post's Sons......West Alexander, Wash.
R. W. Crothers & Son.......Taylorstown, Wash.

### CHEVIOT.

S. V. McDowell & Son.........Fredonia, Mercer
A. M. Dickson & Son......Cochranton, Crawford

### SOUTHDOWNS.

Ludwig S. Filbert......Fox Chase, Philadelphia
Edward Walter............Westchester, Chester
W. A. McCoy & Sons...........Mercer, Mercer
R. C. Vance..........Burgettstown, Washington

### DORSETS.

T. M. McKee...............Lewistown, Mifflin
A. S. Eagleson.........Washington, Washington
J. B. Henderson......Burgettstown, Washington
S. Shaffer..................Princeton, Lawrence
J. B. Wylie............Washington, Washington
Henry Palmer...............Avondale, Chester
A. M. Dickson & Son.....Cochranton, Crawford

### LINCOLNS.

Benj. McKeehan.........Mt. Rock, Cumberland
T. M. Shively...............Mifflinburg, Union
W. A. McCoy & Sons...........Mercer, Mercer

### COTSWOLDS.

S. V. McDowell & Son.........Fredonia, Mercer
R. S. Love.........Mt. Pleasant, Westmoreland

### HAMPSHIRES.

W. J. Monroe.......Greensburg, Westmoreland
Jas. Blair.................Hartstown, Crawford
Edward Walter............Westchester, Chester
A. M. Dickson & Son.....Cochranton, Crawford

### LEICESTERS.

W. A. McCoy & Sons..........Mercer, Mercer

### OXFORDS.

A. G. Shaffer..........Rural Valley, Armstrong
A. S. Worden...................Frederick, Md.

### SPANISH MERINOS.

Jas. Lindsay & Sons............Utica, Venango
Lee R. Scott.........Burgettstown, Washington

### SHROPSHIRES.

J. C. Mattern & Sons.......Hollidaysburg. Blair
J. F. Lantz & Co..........Wyebrooke, Chester
Edward Walter...........Westchester, Chester
Wm. F. Gable..............Wyebrooke, Chester
C. A. Hershey...............Gettysburg, Adams
S. Shaffer...................Princeton, Lawrence
A. T. Replogle...............Waterside, Bedford
Jos. T. Fleming.................Belleville, Mifflin
Clarence M. Glasgow........Calvin, Huntingdon
W. C. Black....................Mercer, Mercer
B. L. Post's Sons.......West Alexander, Wash.
Sidney F. Isett.......Spruce Creek, Huntingdon
Herman Hoopes............Westchester, Chester
D. S. Kloss.......................Tyrone, Blair
J. C. Andrews.................Mattie, Bedford
Wm. Thompson.................Lemont, Center
John W. Burket..................Tyrone, Blair
D. W. Jones.................Wilmore, Cambria

### ANGORA GOATS.

R. S. Love.........Mt. Pleasant, Westmoreland
A. M. Dickson & Son....Cochranton, Crawford

## POULTRY.

### PLYMOUTH ROCKS.

W. J. Monroe.......Greensburg, Westmoreland
W. T. Suter (W.)...Riverside, Northumberland
J. A. Herr (B)................Mill Hall, Clinton
M. N. Clark (B)........Claridge, Westmoreland
Edward Walter............Westchester, Chester
J. F. Lantz & Co............Wyebrooke, Chester
Penn'a State College......State College, Center
A. P. Warren (B&Buff)...Elizabeth, Allegheny
T. M. McKee (B)............Lewistown, Mifflin
D. N. App (B & W).........Selinsgrove, Snyder
Jas. H. Cowan............Duquesne, Allegheny
Nelson Poorbaugh (Wh)....Mt. Pleasant, West.
C. A. Hershey (B)..........Gettysburg, Adams
M. P. Shoemaker & Bro. (W)..Greensbg, West.
W. H. Gray (B)...........Brookville, Bradford
H. M. Lyon & Sons (B)....Wyalusing, Bradford
D. W. Jones.................Wilmore, Cambria
Geo. S. Barnhart.....Greensburg, Westmoreland
Wm. Thompson.................Lemont, Center
Sidney F. Isett.......Spruce Creek, Huntingdon
J. I. Barley...........Baker's Summit, Bedford
John A. Cummins (B).....Waynesburg, Greene
G. D. Walker...................Salona, Clinton
A. T. Replogle..............Waterside, Bedford
Dr. J. Stewart Lacock (Wh)...Pittsburg, Ally.
W. F. Wagner (B).....Harrison City, Westm'd
J. L. Stouffer (B).....Southwest, Westmoreland
Jos. T. Fleming (Wh).........Belleville, Mifflin
Burns & Adams............Imperial, Allegheny
Wm. Thompson, Jr. (B).........Lemont, Center
J. H. Peachey (B)............Belleville, Mifflin
J. Wolf Evans (Bf)........Spring Mills, Center
Herman Hoopes (B).......Westchester, Chester
A. S. Eagleson & Sons (B)..Washington, Wash.
N. O. Brownlee (B)......Crothers, Washington
S. V. McDowell & Sons (B)....Fredonia, Mercer
Henry Palmer (Bf)...........Avondale, Chester
J. C. Andrews (B).............Mattie, Bedford
W. A. McCoy & Sons (Wh)....Mercer, Mercer
Nelson Bros. (B)............Grove City, Mercer
Penn'a State College (B)..State College, Center
R. S. Love (W).....Mt. Pleasant, Westmorel'd
J. M. Paxton (Bf)........Houston, Washington
J. H. Silvis..............Greensburg, Westm'd
D. H. Waite........Warrior's Mark, Huntingdon

D. E. Notestine..............Lewistown, Mifflin

### COCHINS.

J. N. Glover (B).............Vicksburg, Union
Pa. State College (RC(...State College, Center
John M. Berry (Wh).......Wylandville, Wash.
Pa. State College (Bf).....State College, Center

### RHODE ISLAND REDS.

R. F. Shannon............Pittsburg, Allegheny
Pa. State College (PC)...State College, Center
D. Norman App............Selinsgrove, Snyder

### ORPINGTONS.

R. F. Shannon.............Pittsburg, Allegheny
J. N. Glover..................Vicksburg, Union

### BLACK POLISH.

Pa. State College (WC)...State College, Center

### WYANDOTTES.

Jas. I. Thompson (W)..........Lemont, Center
Pa. State College.........State College, Center
Julius LeMoyne (Wh).......Washington, Wash.
F. E. Traver (Buff).........Wyebrooke, Chester
R. W. Crothers & Son (W)..Taylorstown, Wash.
A. G. Shaffer (Sil.)....Rural Valley, Armstrong
Wm. F. Gable (Bf).........Wyebrooke, Chester
C. A. Hershey (Wh)........Gettysburg, Adams
L. W. Lighty (Wh)........East Berlin, Adams
D. W. Jones.................Wilmore, Cambria
B. F. Jones (Wh).......South Montrose, Susq.
Dr. J. Stewart Lacock (Wh)....Pittsburg, Ally.
W. F. Holtzer (Bf)...Greensburg, Westmorel'd
B. L. Post's Sons (Wh)..West Alexander, Wash.
Homer Bros. (Bf)...........Greenville, Mercer
H. C. Bughman (SL).....Greensburg, Westm'd
H. H. Snavely.............Willow Street, Lanc.
D. S. Kloss (Wh)................Tyrone, Blair
Ezra Michener..................Michener, Bucks
Pa. State College (W)....State College, Center
R. S. Love (W)........Mt. Pleasant, Westm'd

### MINORCAS.

Wm. F. Gable..............Wyebrooke, Chester
R. S. Hartley.............Youngsville, Warren
Pa. State College (Blk)....State College, Center
R. F. Shannon (Bl)..Edgeworth Sta., Allegheny

### BRAHMAS.

Edward Walter.............Westchester, Chester
B. E. Ferris (Lt)..................Hector, Potter
Clarence M. Glasgow (Lt)..Calvin, Huntingdon
Pa. State College (Lt)....State College, Center

### LEGHORNS.

Jas. Lindsey & Son (R C B)...Utica. Venango
W. T. Suter (R C W)....Riverside, Northumbld
G. S. Barnhart (Bf).......Greensburg, Westm'd
J. Wolf Evans (Scw W & B) Spring Mills, Cent'r
R. L. Munce (S C B)......Canonsburg, Wash.
J. E. Woodmansee (Scw)....Lake Como, Wayne
A. P. Warren (Bf).........Elizabeth, Allegheny
Nelson Poorbaugh (Wh)...Mt. Pleasant, West.
M. P. Shoemaker & Bro. (Br).. Gr'nsb'g, West.
W. H. Gray (Wh).........Brookville, Jefferson
L. W. Lighty (Wh).........East Berlin, Adams
Willis W. Hopkins (Br)......Aldenville, Wayne
R. S. Hartley (Bf & Br)..Youngsville, Warren
Geo. G. Strosnider (Br)....Waynesburg, Greene
B. L. Post's Sons (RCB)..W. Alexander, Wash.
H. C. Bughman (Br)....Greensburg. Westm'd
Nelson Bros. (S C B).......Grove City, Mercer
Pa. State College (SCW) State College. Center
R. S. Love (B & W)...Mt. Pleasant, Westm'd
W. F. Holtzer (Wh).......Greensburg, Westm'd

### BANTAMS.

H. C. Bughman......Greensburg, Westmoreland
W. A. McCoy (WhG)...........Mercer, Mercer
R. F. Shannon (BBRGame)...Edgeworth Sta.,
.......................Allegheny

R. S. Hartley (Bf Coch)...Youngsville, Warren
E. B. Boyle............Canonsburg, Washington

### GAMES.

Pa. State College..........State College, Center
R. F. Shannon.......Edgeworth Sta., Allegheny

### FAVEROLLES.

Pa. State College..........State College, Center

### PEAFOWLS.

J. C. Andrews.................Mattie, Bedford
W. A. McCoy & Sons...........Mercer, Mercer
D. W. Jones.................Wilmore, Cambria

### GUINEAS.

W. A. McCoy & Sons (Wh).....Mercer, Mercer

### FERRETS.

Nelson Bros...............Grove City, Mercer

### DUCKS.

Benj. McKeehan (Pekin)...Mt. Rock, Cumberl'd
W. H. Gray (Pekin).......Brookville, Jefferson
W. A. McCoy & Sons..........Mercer, Mercer

### TURKEYS.

B. L. Post's Sons (MB)......Claysville, Wash.
A. G. Shaffer..........Rural Valley, Armstrong
D. N. App (WHol).........Selinsgrove, Snyder
W. H. Gray (Br).........Brookville, Jefferson
B. F. Jones (Bl).........South Montrose, Susq.
J. L. Stouffer (Br)....Southwest, Westmorleand
Clarence M. Glasgow (Br)..Calvin, Huntingdon
Henry H. Randt..............Pipersville, Bucks
J. B. Wylie (WH)....Washington, Washington
W. A. McCoy & Sons (WH)....Mercer, Mercer
D. W. Jones.................Wilmore, Cambria

### WHITE-TIPPED BLACK SPANISH.

Pa. State College..........State College, Center

### GEESE.

W. H. Gray (Tou)..........Brookville, Jefferson
W. A. McCoy & Sons (Emb).....Mercer ,Mercer

## DOGS.

### SCOTCH COLLIES.

Austin Leonard & Son...........Troy, Bradford
Clarence M. Glasgow.......Calvin, Huntingdon
J. C. Andrews.................Mattie, Bedford
Nelson Bros...............Grove City, Mercer
D. W. Jones.................Wilmore, Cambria
Benj. McKeehan.........Mt. Rock, Cumberland
M. P. Shoemaker & Bro......Greenbsurg, West.
W. H. Gray................Brookville, Jefferson
H. M. Lyon & Sons........Wyalusing, Bradford
R. S. Hartley..............Youngsville, Warren
J. I. Barley............Baker's Summit, Bedford
F. B. Stewart..............Espyville, Crawford
J. Grier Dain..................Malvern, Chester
Nelson Bros................Grove City, Mercer
T. M. McKee................Lewistown, Mifflin

### SCOTCH TERRIERS.

R. F. Shannon............Pittsburg, Allegheny

### BULL TERRIERS.

W. C. Norton.................Waymart, Wayne

### ENGLISH SHEEP DOGS.

Benj. McKeehan........Mt. Rock, Cumberland

### FOX HOUNDS.

Willis W. Hopkins...........Aldenville, Wayne

### BEAGLES.

J. F. Lantz & Co...........Glenmoore, Chester

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Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1908

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1908

Master Negative Storage Number: MNS# PSt SNPaAg057.7

1908

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BULLETIN No. 14

OF

# THE PENNSYLVANIA
# LIVE STOCK BREEDERS'
# ASSOCIATION

## PROCEEDINGS AND PAPERS

OF

## THE NINTH ANNUAL MEETING

HELD AT

PITTSBURGH, FEBRUARY 5-6, 1908

BREEDERS OF

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HARTSTOWN, PA.

Proceedings and Papers of

# Ninth Annual Meeting

of the

# Pennsylvania Live Stock Breeders' Association

Held at

Pittsburgh, February 5-6, 1908

### OFFICERS

| | |
|---|---|
| *President,* | *W. C. NORTON, Aldenville* |
| *First Vice-President,* | *DR. LEONARD PEARSON, Philadelphia* |
| *Second Vice-President,* | *M. P. SHOEMAKER, Greensburg* |
| *Secretary,* | *E. S. BAYARD, East End, Pittsburgh* |
| *Treasurer,* | *J. F. LANTZ, Wyebrooke* |

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1908

### ACKNOWLEDGMENT.

The Pennsylvania Live Stock Breeders' Association desires to acknowledge the kindness of the following, who have donated Cups for its Third Annual Corn Show:

| | |
|---|---|
| Dr. Thos. Tumbull, Jr | Pittsburgh, Pa. |
| Penn'a Agricultural College Instructors | State College, Pa. |
| Faculty of the Veterinary College of the University of Pennsylvania, | Philadelphia, Pa. |
| The Department of Agriculture | Harrisburg, Pa. |
| Hon. Vance C. McCormick | Harrisburg, Pa. |
| R. T. Shannon, Esq | Pittsburgh, Pa. |
| The American Agriculturalist | New York, N. Y. |
| The National Stockman and Farmer | Pittsburgh, Pa. |

Also the following, who donated prizes to the Second Annual Corn Show at Pittsburgh, February 5-6, 1908:

| | |
|---|---|
| Dr. Thomas Tumbull, Jr | Pittsburgh, Pa. |
| Oliver Chilled Plow Works | South Bend, Ind. |
| American Fork & Hoe Co | Cleveland, O. |
| Frank N. Champe | Cambridge City, Ind. |

We desire to thank, also, the kindness of the press in publishing our notices, and all our friends everywhere for their co-operation.

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# PENNSYLVANIA
# LIVE STOCK BREEDERS' ASSOCIATION

## PROCEEDINGS OF THE NINTH ANNUAL MEETING
HELD AT
## PITTSBURGH, PA., FEBRUARY 5-6, 1908

### WEDNESDAY, FEBRUARY 5, 9:30 A. M.

President Norton in the Chair.

The President: The meeting will please come to order. The first thing on the program will be the reports of officers. Have you anything to say, Mr. Bayard?

Mr. Bayard: I don't think I have anything to say except what is in the report of last year. We have about two thousand copies of this report, and you can take as many of them as you want.

Our corn show is better than I anticipated. Everybody who grows it knows what this last year has been for corn, and I am glad to see this exhibit looking so much better than any of us expected.

The Association is in good shape. I think I should say right here that the Department of Agriculture, through Secretary Critchfield, has helped us in every way possible, and we have in turn helped it. The Secretary is here now, and I suggest that we ask him to make an address. Last year we also had the pleasure of having him with us. We held our meeting in conjunction with the State Board of Agriculture, at which he presided. Let us hear from you, Mr. Critchfield.

Secretary Critchfield: I don't think I have any report to make. I know we all had a very good time last year. I was surprised beyond my power to express at the corn exhibition we had, and the general interest and good feeling manifested throughout the sessions, and I believe that we not only had a good time, but that a great deal of good was done by the dissemination of agricultural knowledge. I hope that before the close of this session we may be able to make some arrangement whereby we can all meet together again next year. It is a little difficult to find a room large enough to fill the requirements of such a meeting. We found a room last year, but I don't know whether we will be able to get it again next year; still, I have no doubt we can find a room that will accommodate us all and I do not see why we should not get together again, and be mutually helpful to each other.

I am in full accord with the views expressed by your Secretary, that the State Live Stock Association should prove helpful to the Department of Agriculture. I consider this Association one of the mainstays on which the Department can lean. A number of times I have had occasion to write to your Secretary for information, and I have always received prompt replies, and help that has been readily given.

I am glad to be with you, and hope to meet you all again next year at a joint meeting of your Association and the State Board of Agriculture.

The President: Is the Treasurer ready to make his report?

The Treasurer: My report will be very brief: the last meeting left us with a

| | |
|---|---|
| Balance on hand of | $ 83.16 |
| Receipts during the year | 746.22 |
| Total | $829.38 |
| Expenditures | 482.73 |
| Leaving balance of | $346.65 |
| To which must be added amount received from Mr. Bayard since making up the report | 32.25 |
| Making net balance on hand | $378.90 |

I would just like to add that I have the Breeders' Association badges here. They are very catchy, and I will be here at the desk, and will be much pleased to have the members and others who are with us, come forward and receive them, and pay their annual dues. We may need them before the session is over.

The President: We need the dollars more than they do the badges.

The Secretary: I want to say that that report looks better than it really is. The bills are not all in yet. I tried to get them in in time for Mr. Lantz to prepare his statement, but did not succeed in doing so. They will soon be in now, and then the report, I am sorry to say, won't look quite as good as it appears here.

The President: Gentlemen, we should like you all to become members. We want to help the live stock breeders of the State. We want to advance the interests not only of the Live Stock Breeders' Association, but of the agriculture of the state generally. So far as I am concerned, personally, I am heartily in sympathy with the work of agriculture through the Department of Agriculture, and also with the work of State College. We are all united, and if we hold together we can accomplish something, but if divided, we will not do much.

As far as the President's address is concerned, I have been President for so many years that I think we will all agree to cut that out. Most of you know that I am in hearty sympathy with the work of the Breeders' Association, and also with agriculture.

Are there any reports of Committees? I was Chairman of the Legislative Committee, and also of the State Fair Committee, and I will make my report later, when we can renew the questions, and then I should like to hear from you in regard to them.

Is there any miscellaneous business?

The Secretary: I don't think there is anything special.

The President: The appointment of the Committees I will make a little later, before the opening of the session this afternoon. We will now take up the program. The first thing on the program is an address by C. L. Taggart, on "How the Champion Carcass Was Made." I have the pleasure of introducing to you Mr. Taggart.

## HOW THE CHAMPION CARCASS WAS MADE

### By. C. L. Taggart, Washington, Pa.

During the short time that I was feeding and caring for the steer "Squire Good," that was the Grand Champion carcass at the last International Exposition, there were some things that naturally came to my mind with regard to where this steer would stand in a show where such a large crowd of the best cattle of all the best breeds of both Canada and the United States would be found. But there was one thought that did not occur to me, and that was, should I win, I would be asked by the Pennsylvania Live Stock Breeders' Association to give an account of how it was done. And I certainly consider it an honor to be asked by this Association to do so. As this was the first Champion Steer that Pennsylvania ever sent to the International Exposition, and as you are all trying to breed the best stock you can, I hope that what I may say will be of interest to you.

While I will try to give a short account of how this champion was made, do not understand that I am laying down rules to go by for making champions, for the feed and care you give one animal will not likely be exactly right for any other. I think it necessary that some facts should be given concerning the price paid, the premium won, and some statements from the judge, and also the butchers who bought the carcass, so as to make it clear to every one that "Squire Good" did not win the double ribbons because of any mistake of the judge, or by any game of chance, but won them because he was the best.

This carcass was sold at auction for 17½c per pound, or $128.21 for the carcass, and won $210 in premiums. There were thirty-one head in the contest, all older than he. The price per pound paid for the carcass was 5½c higher than any other carcass in the contest sold for, and 2½c higher than the champion carcass in 1906 sold for. The champion carcass of 1906 and 1907 were both judged by the same judge, and sold to the same butchers. The judge pronounced the 1907 carcass one of the best he had ever seen. The butchers who bought it said that they paid the highest price for it that they ever paid for beef in their experience of twenty years. All this is certainly evidence enough to prove that Pennsylvania can, and has, produced just as good beef as any that was ever sold at auction at any International show at Chicago, and on making inquiry of one that should know I have not found any one that has any record of one selling for as much per pou

With regard to the breeding of this steer I will say that he was practically a pure bred Angus, but was not eligible to registration, because I did not have registry papers of his dam. His sire is a bull of over a ton in weight and is a son of "Valiant Knight 2nd," a champion of three International shows. "Squire Good" was calved July 23rd, 1906. When he was about four or five weeks old I decided that he was as near a perfect calf as any I had ever seen, and if he was properly fed and cared for he ought to be a winner some day. He was let run in the field with his dam until November 1st. He was then brought into the barn every night, and given a few handfuls of corn, oats and bran, and a little clover hay. He was a little shy at first, but soon became very gentle. On November 29th he weighed 350 pounds. After that he was kept in the barn at night and ran in the open barn shed and small yard in the day time. He did not run with his dam, but she was let in with him morning and evening. He did not have a nurse cow.

His feed was gradually increased from this on till spring, from two pounds a day to about seven pounds. On April 19th he weighed 700 pounds, having made an average gain of 2½ pounds a day since November 29th. He was always weighed in the morning without hay or water. His feed during this period was principally equal parts of ground corn, oats and bran, with a small quantity of oil meal and a few pounds of roots. The last month he was fed before being let out to grass, he made a gain of three pounds a day. When the grass was well started, he was let out in the field for half a day or so at a time. About the middle of May he was weaned and turned into a field of good blue grass, and was then fed a light feed twice a day of corn, oats and bran. As there was a great deal of rain last summer, the grass did not seem to be so good for fattening as usual, and he did not gain quite as fast as I expected he would. He was not in the stable again until August 1st. He was then taken from the pasture and put in a shed 20x40, where there was running water all the time. He was not tied, because I think an animal can rest much better when loose. After he was shut up I fed him three times a day, on the same kind of feed that he got in the winter, except that new corn was added in September. The ground feed was gradually diminished and the new corn increased until he was eating nearly half a bushel of ear corn a day. For several weeks before the show he was fed four times a day. The feed was changed frequently, in order to keep him from tiring of his feed, and to keep his appetite good. If he did not clean his food up I did not give him quite so much the next time. I did not keep salt in front of him all the time, but gave him nearly all he wanted every day. After he was shut up he never missed a feed, and was fed at regular hours as near as possible. I did not use the brush much except on wet days, until several weeks before the show, and I think it was time well spent. When he left my place in November he was sixteen months old and weighed 1,150 pounds.

As I have been studying the beef question pretty closely for some time back, there are several things that seem plain to me, and these are: If we expect to raise prize beef, we must raise the kind that pleases the butchers and the consumers. They are usually ready to pay a good price for the kind they can get the most meat out of, and this kind will, of course, make the most profitable kind for the producer. There may have been a time when the carcass with great rolls of waste fat on it was at a premium, but that time is past; and I think that some statements that I have from butchers that bought the champion carcass will bear this out, for they said that the very fat carcasses in the contest were the ones that sold for the least money, and some were so fat that they would not even bid on them.

As Pennsylvania produced her first champion wether carcass last year, and her first champion steer carcass this year, it is evident that we do not have to be in the great corn belt to produce champions. But location and feed are not the only factors to be considered; for if we expect to win we must have a good individual and good blood.

The President: This paper is now open for discussion, and Mr. Taggart will no doubt readily answer any questions.

The Secretary: I would like to ask Mr. Taggart what he meant by "Pennsylvania's champion mutton carcass last year?"

Mr. Taggart: It was the one that Mr. Henderson produced.

The Secretary: Henderson, stand up, so that we can see you, and tell us all about it.

Mr. Henderson: That wether was champion in his class. The grand champion carcass was a lamb last year.

Mr. Lamont: Will Mr. Taggart please tell us the age?

Mr. Taggart: He was sixteen months old.

Mr. Lamont: I told a man this morning he was nineteen; I was not sure.

Mr. Lamont: Will Mr. Taggart please give us the weight? We represent the same county, so you will not think my questions strange.

Mr. Taggart: He weighed the day he was shipped 1,150 pounds.

A Member: I would like to ask Mr. Taggart whether he took particular pains to figure out a balanced ration for him when he was fed?

Mr. Taggart: I have been studying the question of feeding for some time, and I picked out what I thought was as near as I could get to it.

A Member: In actual figures?

Mr. Taggart: Yes, sir.

Mr. Bayard: In what proportion was the oats and hay and corn? Did you give it by measure or by weight?

Mr. Taggart: By measure.

Mr. Norton: According to that, he was fed a good deal of protein. Any more questions? I want you to wake up, gentlemen. We always had a live meeting, and I don't want a dead one this year. We got these gentlemen here to answer questions, and I don't want you to be afraid to ask them.

Mr. Clark: Would a breeder in Western Pennsylvania be able to compete in the market with the Western cattle?

Mr. Taggart: I don't think he could.

Mr. Critchfield: The paper read by Mr. Taggart brings out one very important fact that I think we should all remember. It is that if your breeders and feeders of live stock expect to do their best, they want to get their stock into the market as early as possible. Here was a steer that was a little over a year old, and weighed 1150 pounds. I suppose that calf, although he says he was strong, and a perfect calf, did not weigh over a hundred pounds, to begin with. Then there must have been a thousand pounds put on him. If he had fed that steer a second year, the probability is that he would not have added more than four hundred pounds to it, and it would have required more to feed him the second year than it did the first, and more to keep him the third year than it did the second, while he gained even less weight the third year than he did the second. So, in order to get the best results, we want to get our cattle ready for the market just as early as possible.

The President: I think there was some one else wanted to ask a question.

A Member: What was the dressed weight?

Mr. Taggart: 691 pounds, whole weight.

The President: Anything more? If not, we will take up the next subject on the program, an address on "Flock Management" by Dick Stone, of Stonington, Ill. I am pleased to introduce to you Mr. Stone.

Mr. Stone: Mr. President, when I received the announcement from your Secretary that he wished me to come here, I wondered what ever it was for. I supposed he had found out that I had married a Pennsylvania girl, and he wanted to find out what a mistake she made when she went West. This is the mistake.

When I saw the name of Norton as President of this Association, I thought "How the cream will always rise to the top!" This gentleman and I have been acquainted for a good many years. I have known him under almost every circumstance that was possible, and I have always found him a gentleman, and I think you gentlemen of Pennsylvania have also found him so. I think he is the right man in the right place, and if I were you, I would try to keep him there. He has been with us in the West, and he has showed us what it is possible for Pennsylvania to do.

When you farmers and breeders here in Pennsylvania want to do a thing of any particular importance, you simply do it, and think it is a very great thing, even though you have not had any encouragement. But it is well to remember that you want to go before your Legislature and ask them to back you up in your efforts, but you must remember first of all, in doing that that the men who are in the Legislature are voted there. You must vote for them before they vote for you, and you can give a man almost everything, but you can't feed him, except from the soil, so look who you are voting for. I am glad to see that the breeders and farmers are acting in harmony in this; and if you keep at it long enough there is little doubt but that you will get all you want.

The subject you people have given me is "Flock Management," but I give it the name of "The Shepherd Among His Flocks." I will read you a little paper this morning. My wife and I got it up; she did the most of it, so it is really a Pennsylvania production. Your Secretary—where is he? Just behind me, when I want to talk to him. This paper is merely a skeleton, and I want you to ask questions. If there is any man on earth who can answer questions I am the one. That is where I shine. I won't promise you that I will always answer them correctly, but I will answer them. I will now spring this little paper on you. I have to use a paper, because once I begin, I never know where to stop, but when I have a paper, and get to the end of it, I stop. I have to put on my spectacles, because my eyes are getting too young. The great thing at these meetings is not what they hear from the speaker, but what they get afterwards in the discussion, so let us have an old-fashioned Methodist meeting, and ask questions, and tell our experiences. Now, then, for the paper.

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## THE SHEPHERD AND HIS FLOCK

### By Dick Stone

Down through the historical record of mankind from the day of the first Shepherd of the first family, Abel, the Shepherds or Flock Masters have ever been considered the highest type of moral and Christian manhood. Science proves that almost the total character of man is influenced and developed by his surroundings and his associations. Science also proves that certain character traits are greatly influenced by man's constant care of certain domestic animals. Therefore the boy or man who takes an interest in the care of flocks will develop character traits that will prove an honor and a blessing through the years of his life.

Kindness, gentleness and patience are the great elements of the true shepherd's makeup. To the word patience we will also add the term persistence. It is the man with the iron will, with dogged determination who is to succeed in this age of sheep keeping. Our reverses and set-backs should never discourage us but instead guide us to a greater endeavor. The "sticker" is truly the winner in this as in every other undertaking. The brutal man, the individual who has only a curse and a blow for each dumb brute under his care should never venture into sheep keeping. The sheep is an extremely nervous and tender animal and therefore cannot withstand excitement and rough usage. With quiet handling the flock will thrive.

The sheep have often been termed the Golden Hoofs, in England they are termed the rent payers, in fact the sheep gives the quickest money returns and the greatest dividends, considering capital involved, of any of our domestic creatures.

Wool, Lambs and Mutton are the commercial products of the flock. This is not mentioning the valuable fertilizer produced by the sheep which is returned to the soil. The flock also helps to enrich its owner by keeping his premises free from foul weeds. There is scarcely a variety of weed the sheep will not consume, and for cleaning up foul pastures and fields they are invaluable. The sheep is certainly a sound financial proposition to any farmer or stockman and will always do its share at mortgage lifting.

A great fault with many people is to rush into the purchase of stock before they have provided any protection or fencing. It is foolhardy and crude to expect sheep to thrive with only the lee side of a barb wire fence for protection from winter blasts and driving storms. Provide a shed for them. A shed 16 by 24 will house nicely from 25 to 30 sheep. The house or shed should be located upon high dry ground and use "Mother Earth" to constitute the floor. Such a floor well bedded with dry straw is ideal for sheep. The sides under the eaves need not be over 4 feet in height and make it 10 feet at the ridge. Provide a good sound roof for a leaky covering is a source of much discomfort to sheep. The shed should be well lighted by glazed windows at each end of the building. These can be open in close weather to allow ventilation. The windows should be placed high enough so no draught will strike the sheep.

The pasture should be changed often for placing the flock upon fresh pasture at short intervals tends to keep the pasture free from parasites. It is a wise plan to provide two or more pastures and use these pastures alternately for sheep and cattle or sheep and horses. For the pasture you should select high, dry and slightly rolling land, and it should contain a liberal supply of shade trees. Shade is a necessity for the flock during the heated term of the summer; if possible have some running water. After horses and cattle have grazed a pasture over for a few weeks it will be again safe for the sheep. Clover should enter largely into the pasture grasses, provide rape patches for the late summer and fall pasturage also let your flock pick over the meadow after haying and stubble fields after harvest. All such pasture changes give the sheep a variety. Pasturing the flock on this plan keeps them in perfect health. While sheep are not extravagant eaters, yet they should not be compelled to forage all the year round and do not compel them to subsist on one diet alone. A change is good for them the same as for man. Clover hay is an ideal roughage for them and corn stover is good but roots, beets or turnips go well with the latter as a neutralizer, and an occasional feed of bran will also tone up the system where roughage is scarce. Oats perhaps is the best grain feed. As the lambing season approaches the grain ration should be increased. Have the ewes in good thrifty condition and there will be less loss of lambs, and if roots are fed they have a tendency to increase the flow of milk. If the lambs are weak or the ewe has no milk feed cow's milk till they are able to take care of themselves. Sometimes a ewe will not own her lamb. Be around and keep a grasp on the situation. It is the little details that count for success or failure.

A Member: What about stomach worms?

Mr. Stone: I should not think there would be much trouble with stomach worms on your hillsides. These stomach worms are almost, if not quite, as troublesome as the flocks themselves. Hillsides are what make sheep, and I do not see why Pennsylvania, with all her hills, is not one of the greatest sheep states of the Union.

'I want to say that the reason we should have horses and sheep is, that the rough grass of the pastures can be utilized by the horse, and the sheep will still have enough. They like the new, tender grass, but they do not thrive well on bluegrass. Clover is the grass they want, and yet we hear that clover is one of the most detrimental things we can raise, because it takes a fertile soil. But I think we will have to go on with the sheep, only don't come to me because I can't supply you. Now, gentlemen, proceed: you can cross-examine me all you please, but I can't promise to answer all you ask; my wife wrote the greater part of this, and she is not here. But it's in answering questions that I shine; so ask them.

A Member: Will silage take the place of roots in winter?

Mr. Stone: I can't answer that question, because I have never had any silage in my life. We got into that question a few days ago, at another meeting, and from what they said who feed it I think it will, but I don't think it will do the same as roots. You know when English people get on a certain line, you can't move them off. Therefore when they get on the root question, they stay there. I think if I had a place for silage I would feed it.

Mr. McCann: You don't feed much corn to stock sheep?

Mr. Stone: Not so much; in the winter we feed a little on the cob. Oats is the chief thing. I know an old man who raised sheep, and when he raised corn, he said corn was exactly what his sheep wanted, and when he had oats, oats was exactly what they wanted. My idea is that it is the pasture they need.

Mr. McCann: My father was a successful sheep man, and he fed them two-thirds to one-third corn, and a little bran.

Mr. Stone: Yes, sir; and no doubt in his day you could buy bran for about $8 a ton, but when you pay $30 for it it is not so nice.

Mr. Critchfield: Will horses and cattle eat with a relish that which is left by the sheep?

Mr. Stone: Oh, yes, sir; it has been told by the cattle men that cattle will not graze where the sheep are, but I have not found it so, but unless you have bluegrass land, horses do not, as a rule, graze well with the sheep.

Mr. Bayard: What do you do for stomach worms?

Mr. Stone: Well, sir, I have tried every remedy on earth. There is a man in Ohio that makes a stomach worm medicine; I have been using it for three years, and have tested it thoroughly, and it is the only thing that I have ever found any good. I have bluegrass pasture; it took me twenty years to prepare it, and I think there lies the secret of the worms. They like to make their home in the bluegrass pasture. I have tried this medicine well for three years, and it has been a success, while in the twenty years before, I had a great deal of trouble with stomach worms, and I tried everything. including gasoline.

Mr. Clark: Have you ever tried turpentine?

Mr. Stone: Oh, yes; and the stomach worm will simply fatten on it; you just help him along.

A Member: How about tobacco?

Mr. Stone: I think those stomach worms are just like men; they enjoy it, and it only helps to build them up.

Mr. Henderson: I would like to ask Mr. Stone if he thinks this medicine will help the sheep when they are about dead?

Mr. Stone: If they are dead—oh, no.

Mr. Henderson: I asked you if you thought it would cure a case that is about dead?

Mr. Stone: And I will tell you that if a sheep is about dead you might as well let him die. That sheep is a goner when he once makes up his mind he wants to die.

Mr. Norton: Is he not dead game?

Mr. Stone: Well, he may be dead game, but not in the same sense as you and I. When you once let a sheep go that far, you might just as well let him go altogether, but even if you let him go until he is almost dead, I think it will be helpful to him if you let him lick the salt.

Mr. Henderson: I think a change of pasture is a big thing.

Mr. Stone: I think so too, and that is where the English beat us; but in our hot sections we can't make as many changes in summer as they do; we can't raise them in hurdles. If we could, we would not have to go back to England for our sheep. You know sheep can't stand much of the hot weather.

A Member: You gave us to understand that you feed corn simply to give heat and that you would prefer oats on all occasions?

Mr. Stone: Yes, sir.

A Member: Is that because you are English?

Mr. Stone: Well, no, not altogether because I am English. I study the character of the country, and the conditions. Now, in England, we feed a little oats, but we also feed a great many peas. Now, I don't have the peas; therefore I get down to the next best thing.

A Member: How about cow peas and soy beans?

Mr. Stone: Well, I suppose I ought to know all about it, but I never saw a cow pea in my life, but I think if we can raise cow peas and soy beans where we can't raise anything else, it is all right to do so.

A Member: What is your variety of sheep?

Mr. Stone: Well, sir, I was not going to tell anything about that, for the simple reason that I was not going to advertise myself. My business has gone beyond me. In breeding sheep the sheep that you prefer is the best sheep for you to handle. For you fellows here in Pennsylvania, a heavy sheep is not the best to handle. I breed the Oxforddown, but I think if I was here in Pennsylvania I would breed the little Southdown. I would have a light-footed breed to climb these hills. Then, you have the Merino. He was, I think, a good thing about the time the old gentleman spoke to his son Isaac, when he was caught in the thicket, but I don't think he is a good breed today. On your hill-sides he is a pretty good breed, but if you use a light-footed mutton breed there I think you will do better. You know that a great, big, four hundred pound sheep climbing those hills would not do well.

A Member: Can you tell us something about the English breeds? Do you know anything about the Shropshires?

Mr. Stone: Yes, sir; yes, sir; I brought some across the water; some of the very best that were ever in this country.

A Member: They produce a good deal of good mutton, don't they?

Mr. Stone: Oh, well, I think the Shrop stands about third place.

A Member: I have always understood

that the Southdown makes a fine mutton, but that he does not make good as a breeder.

Mr. Stone: I am not advocating any particular breed, and I don't think there is any one proper breed, but I do think that for a poor boy to start out with the Southdown is not the proper thing. Let him wait until he gets going before he goes in for this breed. I told them in England that we can't tell any difference between Southdown and Shropshire mutton except by its size. Now, I would say that the Shropshire belongs to the fancy variety. You will ask me my reason; you know I have a reason for everything. The reason I give you for the Shropshire being down to the third place today is this: These men in England have bred him for his fancy points, until they have lost size. Now, the American people don't want to eat the head, even if they have to eat it in the head cheese that my brother makes, and when they breed him until the wool goes down to his eyes, there is not much else there. Now, the plain-headed Shrop is all right, but the fancy one is a little behind, and—well, that is the reason I think he is about third class.

Mr. Sharpless: Is it advisable to have the ewes fat at lambing time?

Mr. Stone: I don't want to have them fat on grain. If they get fat on grass I have nothing to say, but if you fatten them on grain I don't believe in that. I have learned in the last few years not to fatten up until we want to sell. You take a man who is a high feeder, and he will get too tight, and it is the same way with the sheep. We used to fatten our hogs in the same way, but now we don't want much fat on them; we want muscle.

Mr. Bayard: When do your lambs begin to come?

Mr. Stone: The first ones came yesterday morning, a pair of them, and I think I will name them for the President and Secretary of this Association.

Mr. Lantz: Why don't you tell the man who makes the stomach worm remedy to advertise in some of the Eastern papers?

Mr. Stone: I think he must be something like me—too modest to advertise himself.

Mr. Bayard: I think he is out in Ohio, and he has advertised with us, but I am not sure whether he does so now, or not.

Mr. Sharpless: If you gentlemen took The Stockman, you would know all about him; he advertises in it.

Mr. McGowan: I would like to ask about the sheep shed that you have described, and what arrangement there is for opening it, so as to get in plenty of light and air.

Mr. Stone: Well, I simply mentioned it to show that a little, cheap affair, would do better than nothing at all. We make a bed with a little straw; that is better than nothing at all. The straw can't muss up, and the lambs will be kept warm.

Mr. McGowan: I think a loft is economical.

Mr. Stone: That is all right for you fellows here in Pennsylvania, with your big barns, and over-hanging lofts, but I was talking of the man who has nothing but the side of a barb wire fence. Here, in your mountains, when a man keeps sheep, he keeps them in the barn, but out in our country, at least, the man who raises sheep does not always have a barn for them, so I mentioned this little plan to show that he need not have an expensive barn. Here in this country, where you have the fine barns with overhead to keep out the wind and cold, you are well fixed to take care of sheep, but when you do not have tnem, the wind and cold and rain are very hard on the sheep, and we must protect them in some way.

The President: Any more questions?

Mr. Britt: I don't want to butt into this thing, but I would like to take up the question of silage. Now, we are using our corn in this way, and I want to say that we are raising sheep very successfully with it. We began a couple of years ago to simply feed it to the ewes at lambing season, and it answered very well. We put it in the trough, and in a few days we could not get near to put in the silage. We had to put the sheep out before we could put the silage into the trough. It is the most economical way to feed sheep.

Mr. Taggart: I wish you would tell us how you put it up. The sheep do not like it after it begins to sour; that has been my experience.

Mr. Britt: I can tell you how you want to do it. You plant the corn about the usual time, about three pecks of B. & W. corn (Southern corn) and one peck of Northern Yellow corn. Then you drill the two together, and let them grow until the leaves on the lower part of the stalk are beginning to turn yellow. When there is just milk in the grains, we begin to cut it. We find that the yellow corn about that time is pretty ripe, and that is when we want to cut the ensilage corn. The idea is to get the mixture there.

Mr. Taggart: Do you pack the silo?

Mr. Britt: No, sir; we simply throw it into the elevator, and then even it up all around the sides with the fork.

Mr. Taggart: How much do you feed?

Mr. Britt: Well, of course, I have never had enough silage to feed a full ration. To about fifty ewes we feed a two bushel basket.

Mr. Taggart: About a pound to each one?

Mr. Britt: Well, a cubic foot of silage will weigh about forty pounds. That would be about forty pounds.

Mr. Henderson: I might add that we have had a little experience in feeding silage; we used three pounds a day with no bad results. I like to have the corn well matured before I put it in the silo. We had some corn last year that we wanted to put into the silo. When the corn in the field looked ripe we cut it and the stock liked it.

Mr. Taggart: What did you feed it with?

Mr. Henderson: We fed it with bran and oil meal to the lambs; I did not experiment with the ewes.

Mr. Taggart: Did you raise any clover?

Mr. Henderson: We had fed it, but this year we are short of clover, and we are now feeding timothy hay.

Mr. Power: I was wondering what breed of sheep you had, because no good breed would stand so much luxury.

A Member: I have been feeding silage, and have liked it all right. The time you are about ready to cut your corn you cut it for silage also.

Mr. Taggart: You talk about oil cake; what do you pay for it?

A Member: I paid $31 this year.

Mr. Wagner: It is cheaper to feed oil meal at $30 than bran at $20.

Mr. Stone: That is so, but I don't feed either.

Mr. Power: You know it should be fed with silage. Silage is constipating, and you want a little cake, or a little bran. I generally use the cotton-seed meal.

Mr. Norton: Did you ever feed cottonseed meal to sheep, Mr. Stone?

Mr. Stone: No, sir; I fed it to the hogs, and I had a beautiful lot of dead hogs, so I quit the business and fed salt.

A Member: Mr. Stone, did you ever feed alfalfa to sheep?

Mr. Stone: Yes, sir; I do not grow it, but it is a very nice sheep feed.

A Member: Is your land too poor to grow it?

Mr. Stone: No. sir; but we change our land a good deal, and I grow red clover, and I think it fills the bill. I had some land in alfalfa, and it was all right until we went to break it up. It was like breaking a hazel bush for me. On the timber land in our country it grows very luxuriantly, and on the black prairie sod it grows very beautifully for two or three years, but it does not seem to stand. I have known people to grow forty acres of it, and all at once it disappeared. Where it went to I don't know, but in the spring it went away. In the timber I find it is better every year, but not on the black soil. That is the reason I don't raise any. I grow corn. We live in the corn belt.

Mr. Lantz: The purpose of feeding silage to sheep is not clear to me, and I would like to ask the gentlemen who feed it whether they feed it to take the place of roots for succulence, or whether for clover as nourishment? If they feed it for succulence I think it is dangerous. Another thing, I think roots can be produced at much less expense. I prefer to grow turnips. I raise them and leave them in the field. It does not give you anything to harvest or seed. I would ask whether they use it for roughage, or whether they feed it for succulence. Succulence is an important matter with us. Our Pennsylvania people have not learned this as they should.

Mr. Stone: I think I can answer that. These gentlemen use the silage in the winter, and your turnips would not do in that way.

Mr. Lantz: Oh, yes, I feed them in the winter; I keep them in the cellar, and they keep perfectly dry.

Mr. Stone: You spoke about succulence. I think the ensilage is the cheapest manner of producing this succulence. It produces more tons to the acre than anything else. That is how I look at it. Now, I am a great root fellow, but I find, in our country, that it is the fellow who has to do the hoeing that does the work. With the sun beating down on a man's spine at 110 degrees in the shade it is not a very pleasant job stooping over and hoeing, and we are getting so that we can't get men to hire out on the farms. We can't get anybody to do the work, and I am not going to do it myself; I'm getting too old.

Mr. Lantz: We don't hoe them.

Mr. Stone: But you have to pull them in the fall of the year. For winter feed, I think silo is the cheapest thing.

Mr. Power: I use it to take the place of clover, and for succulence also. I would like to hear from the others, as to what they are using it for.

Dr. Hunt: When I lived out in Illinois I was interested largely in the root crop, and after living for three or four years in New York state, and now in Pennsylvania, I made something of a hobby of this root crop, and I will give you the figures for New York and Illinois. I think I have them in my head. In Illinois we raise 4,800 pounds of corn and oats and barley for each animal weighing 1,000 pounds each year. In New York, we raise 800 pounds, and I fancy it is something like that in Pennsylvania. In addition, we raise in New York one and three-quarters tons of hay to each animal. In other words, we raise in Illinois a large percentage of concentrates, and a comparatively small amount of roughage, while in New York and Pennsylvania it is just the opposite. The problem in Pennsylvania and New York state is not merely to get the protein, and to get the succulence, but it is to get he concentrates to take the place of the 4,800 pounds of corn and oats and barley that we raise in Illinois. Now, take the horse; when he eats a hundred pounds of hay he digests forty-one pounds. Experience shows us that if he digests forty-one pounds, he uses up twenty-four pounds for repair, which leaves him seventeen pounds to put strength and flesh on him. Now, you have only seventeen pounds left to do that with. If you feed him corn, you have some eighty-two or eighty-three pounds of digestible matter. We will say he digests that corn so that he has seventy pounds left, instead of seventeen, to do work and put on flesh. Now, if you want to keep your horses and cows throughout the winter on a small concentrate ration, you can do it, but it will leave them weak, and will not make them fat and healthy for work.

Now, as to feeding roots: They are more digestible than corn. Experiments have been made in Denmark with a hundred and fifty cows, carried on for two or three years. The dried matter in a pound of turnips and rutabagas is equal to the dried matter in a pound of oats and barley. Then, we experimented at Cornell for three years, with every kind of root. We tried rutabagas, mangel-wurzels, sugar beets, carrots, parsnips, cabbage and we found them as digestible as corn, and the dry matter in most of them as nourishing. About one-third of the State of New York is a thousand feet above sea level, where corn does not thrive well, and where rutabagas and mangel-wurzels stand a chance of competing with the corn. Now, what I want to call attention to is this: raise roots to put with silo, or hay, or clover, or anything else. They are valuable as a concentrate feed and are worth about half a cent a pound, whereas the concentrate proper is worth a cent and a half. Silage is valuable because it is a water concentrate. That is why the sheep do so well on it. It does not take any power to digest, and will all go into fat.

Mr. Stone: The Englishman said it was ninety per cent water, but it is a very good water. Now, I want to say a little something before I stop. We have raised mangels for thirty years on the same piece of land, and this year I had the biggest crop I ever had in my life. You will wonder why I don't change; I suppose because I have got in the habit of planting them there. I believe we are getting lazier every year, and I have kept the weeds out of that field until there are no weeds there; that is the reason I plant on the same land. I give it few extra loads of manure every year, and this year we received a little over thirty tons of mangels per acre, so you see we get a good deal by it.

Mr. Lantz: I am glad that Dr. Hunt is here and has told us why roots are valuable. I only learned it from thirty years of practical experience. I am not a chemist, and I cannot give you the reason, but I know that it is so. I kept sheep for ten years before I fed roots, and nearly every year I had sheep die from indigestion, or some cause that we did not understand. After I began feeding roots that trouble came to an end. The sheep are always in good condition, and experience has certainly proven that it has saved me fifty per cent of the corn ration, and has increased the weight of the fleece. So I made my suggestion merely from practical experience, and never knew just what it was worth to the sheep. I am glad Dr. Hunt has made that clear to me, and I thank him very much.

Mr. Bayard: There will be a smoker here this evening, gentlemen, held in the old dining room. We are going to have a good, social time, with some songs, and a few speeches.

This cup has been donated by Dr. Turnbull. Stand up, Doctor, and let us see what you look like.

Now, gentlemen, just one word: I think it is only fair to Mr. Kelly, the manager of this hotel, that we patronize the hotel as much as possible. If you don't care to pay the price for a regular meal, there is a dining room on the left, where you can order what you want at reasonable prices. I wish as many of you gentlemen as possibly can, would patronize the hotel, to show our appreciation of his courtesy.

The President: We will now stand adjourned until two o'clock. Try to be on hand promptly; we have a good program for this afternoon.

### WEDNESDAY. FEBRUARY 5, 2 P. M.

President Norton in the chair.

The President: The first thing will be an address on "Alfalfa in Pennsylvania," by Dr. Thomas F. Hunt, of the Pennsylvania State College. I now have the pleasure of introducing to you Professor Hunt.

## ALFALFA IN PENNSYLVANIA

### By Thomas F. Hunt

In reply to questions by the speaker, it was determined that in the audience of about two hundred and fifty, five were raising alfalfa successfully, while seventeen had tried it without success. The speaker called attention to the fact that raising alfalfa in Pennsylvania was much like gold mining, that there were many attempts and only a few successes, but that the successes were worth the whole cost.

The speaker called attention to the fact that for many years he had believed that alfalfa could not be raised successfully where red clover grew well. He subsequently found, however, that his failures to raise alfalfa had been due to the fact that the conditions necessary to success were considerably different from those of red clover. The speaker then said:

There are at least seven factors influencing the successful culture of alfalfa. They are: (1) climate, (2) soil, (3) the treatment of soil including fertilizers and lime, (4) inoculation, (5) quantity and quality of seed, (6) time of seeding, (7) after treatment of the crop. The above items are intended to include all the elements necessary for the successful growth of alfalfa. There are some soils and some climates where alfalfa grows so well that not all these factors are essential. The conditions are so suited to alfalfa that all that is necessary is to sow the seed. This, however, is not the situation on most soils in Pennsylvania. If you want to raise alfalfa successfully in this state it is necessary to give careful attention to all the factors as above outlined.

**Climate.**

Alfalfa is greatly influenced by temperature, much more so than red clover. This can be illustrated by stating that in Arizona two-thirds of all the hay raised is alfalfa, in Colorado one-half, in Wyoming one-fifth, while in Montana only 1-400th of all the hay raised is alfalfa. The alfalfa plant is also affected by moisture. It is a dry weather plant and well adapted to being grown by irrigation. It is especially adapted to that section where the rainfall is less than twenty inches. While this must be admitted it is raised successfully where the rainfall is thirty-five inches as, for example, in the neighborhood of Syracuse, N. Y. One reason for the plant being easily affected by excessive moisture is that it is a deep rooted plant and if the water table is too close to the surface it is killed by getting wet feet. A second disadvantage of a moist climate is that the plant is subject to a fungous disease called the spot disease. This is manifested by the appearance of little black spots on the leaves. A third reason why alfalfa is not adapted to a moist climate is the difficulty of curing it. This is especially true of the first and last crops, assuming that four crops are obtained. Thus, for example, in this climate the first crop is ready to cut about the first of June while, as is well known, the weather at this time is not suited for making hay.

**Soil.**

The growth of alfalfa, at least in humid sections, is very much influenced by the soil. The following table shows five soil types on which alfalfa has been grown and with four of which the speaker has had intimate experience.

| | Coarse sand | Fine sand | Silt | Clay |
|---|---|---|---|---|
| Dunkirk gravelly loam | 13.4 | 27.6 | 42.5 | 16.3 |
| Miami stony loam .... | 4.1 | 39.7 | 32.4 | 22.5 |
| Wabash loam .......... | 2.5 | 28.4 | 44.7 | 24.3 |
| Hagerstown clay loam | 3.0 | 8.4 | 58.8 | 29.9 |
| Dunkirk clay loam..... | 2.4 | 10.7 | 56.8 | 29.9 |

The Dunkirk gravelly loam is so well adapted to alfalfa that no special effort is necessary to obtain a good crop except the sowing of sufficient seed. The Miami stony loam also raises alfalfa very sucessfully. It is the type of soil on which alfalfa is raised in the vicinity of Syracuse, N. Y., a region famous in the East for fine crops of alfalfa. It will be noted that both these soils contain large amounts of lime and relatively small amounts of silt and clay. The Wabash soil is an alluvial soil, such as is

found along river bottoms. Alfalfa is not as easily grown on this soil type as it is on the other two, but excellent crops can be obtained if suitable care is taken. The Dunkirk clay loam is a soil on which it is difficult to raise alfalfa, although fair crops have been obtained. It will be noticed that this soil contains over 80 per cent of silt and clay. One difficulty, no doubt, in raising alfalfa on this soil is that the water table is close to the surface which drowns the plant out in the summer and freezes it out in the winter. On the other hand, Hagerstown clay loam, which has an equal amount of silt and clay raises alfalfa with fair success, one reason being, no doubt, that this type of soil on account of its limestone formation has perfect drainage. Another reason, doubtless, is the fact that it is of limestone formation, the alfalfa plant being a lime loving plant.

A Member: Would it make any difference whether the land was level or sloping?

Dr. Hunt: Not necessarily so. It would depend upon how this influenced the water table. In some regions the water table is quite as close to the surface on sloping land as on level land.

The table showing the different soil types is presented here to call attention to the fact that the Experiment Station may be of service in determining whether a soil is likely to be adapted to alfalfa or not. If a sample of soil were sent to us we could determine whether it was similar in physical properties to Dunkirk gravelly loam or Dunkirk clay loam. While we could not state positively that alfalfa could or could not be grown successfully we could tell you whether it was similar to other soil on which alfalfa has or has not been successfully grown.

**Soil Treatment.**

To raise alfalfa successfully you should forget all you ever knew about raising clover. Remember that alfalfa is not a crop to enrich poor land. First give your soil such treatment in previous years as to make it a fertile soil. In Europe this is done by growing a root crop. About Syracuse, N. Y., it is found that alfalfa does well after the land has been cultivated in peas. Probably the best preparation in practice in Pennsylvania is to manure sod land for corn, then cultivate the land in corn for a year and seed to alfalfa. Experiments made at the Cornell Experiment Station under the direction of the speaker showed that on Dunkirk clay loam it was necessary to do three things in order to get a successful growth of alfalfa upon that land: (1) fertilize with stable manure at the rate of from ten to twenty tons per acre, (2) lime with from 1000 to 3000 pounds of lime per acre, and (3) inoculate with from 100 to 400 pounds of soil from an old alfalfa field. It was found by actual tests that no two of these three were enough. Success was only obtained when all three were done. While not all soil may require all three, I am in the habit of recommending strongly all three as a matter of safety.

**Inoculation.**

Land may be inoculated by simply sowing alfalfa seed, although this is a slow process. Land is sometimes inoculated by sowing a pound of alfalfa seed with the clover seed. Thus a few plants become scattered over the field and finally inoculate the soil. While pure cultures are sometimes used the speaker has been in the habit of recommending soil from an old alfalfa field at the rate of one hundred to four hundred pounds to the acre, because actual trials have shown that in at least 90 per cent of the cases this method is effective.

**Seed.**

A very essential factor in the growing of alfalfa is the sowing of sufficient seed, not less than twenty pounds to the acre should be sown and twenty-five pounds will do no harm. If one is not willing to go to the expense of planting plenty of seed he may just as well not attempt to grow alfalfa. Care should be taken also that the seed should be free from dodder. To determine this a sample of the seed may be sent to the U. S. Department of Agriculture at Washington or to the Agricultural Experiment Station at State College. In order to secure a sample of alfalfa seed for determination of the dodder, place the bag of alfalfa seed in your wagon bottom end up. In driving from the station to your farm the tendency will be for the small dodder seeds to work down to the bottom which will be the top of the sack, so that when you open it you will be likely to find the dodder, if any exists.

Mr. Power: Is it not a little lighter than clover? About the same color?

Dr. Hunt: It has a rough surface and a different shape. It has a brownish silvery look while the alfalfa has a shiny appearance.

A Member: What is dodder?

Dr. Hunt: A parasitic plant that lives on the alfalfa and kills it by growing on it. It is generally of a reddish tint and clings around the plant.

A Member: You sometimes see it in the woods?

Dr. Hunt: Yes; there is a species known by some as "love vine." This species, however, generally occurs further South and does not attack alfalfa plants.

**Time of Seeding.**

While it is true you can sow alfalfa any time from the middle or even the first of April to the middle of August or first of September, there are times that are better than others. In my judgment it is safer for the beginner to sow in the spring, although I have obtained fair results by sowing in August. The exact date of sowing cannot, of course, be given but the time may be indicated by stating that the proper time for sowing oats is generally too early and the proper time for planting corn is generally too late for the best spring seeding of alfalfa. This is one reason why a good many people fail with alfalfa. They think of it as a clover plant and, like clover, try to sow it early. If it is not sown at the time indicated the next best time is to sow in August.

Mr. Taggart: How about the first week in May?

Dr. Hunt: That depends upon your location. If the first week in May is generally too early for corn planting then it is probably a good time for sowing alfalfa.

Mr. McCann: I think the right time is when you get the weeds all killed.

**After Treatment of the Crop.**

The first season the alfalfa is planted it should be clipped when it gets six or eight inches high, and the clippings allowed to lie on the ground. This should be continued every time the alfalfa gets six or eight inches high throughout the first season. The next season, which will be the first crop season, care should be taken to cut at the right time. You will go over the field and find the alfalfa looks small and you will say to yourself: "Well, this is not hay making weather, and I shall just leave it awhile." Then you go about something else and in a week or two you come back and you find a few spindling plants, and you say: "O well, I guess I can't grow alfalfa." What has happened? The plant in this country is subject to spot disease. If you see black spots appearing on the lower leaves you should at once cut the crop even though it may not appear to be worth cutting. It must be done in order to stop the spread of the disease and you must remember that you cannot get a second crop until you have cut the first one. Probably more people have failed raising alfalfa on account of not watching their crop closely enough and cutting it at the right time than for any other reason for which they are responsible. You want to watch your alfalfa as closely as Stone watches his lambs. (Mr. Stone interpolates, "Amen.")

A Member: Will it pay to allow the first crop to rot on the ground?

Dr. Hunt: I would take it off even if it is a small crop.

A Member: Do you use a nurse crop?

Dr. Hunt: I do not like to tell you what I believe about it, because if I do you will go and do it and your crop will be a failure. I can raise alfalfa with a nurse crop, but I do not know whether you can or not. If you sow oats and alfalfa together, the chances are that you will sow at the right time for the oats but not at the right time for the alfalfa. If you will sow only a bushel of oats to the acre and sow at the right time for alfalfa, which is later than the right time for the oats, and if you will cut the oats when they are in the milk you will, other conditions favorable, get a crop of alfalfa. If, however, you sow at the best time for the oats and cut your oats for grain your alfalfa is not likely to amount to anything. I have found that I can talk to a class of students and tell them about this matter and every one of them will go and do just what I tell them not to do.

A Member: If we sent over to Ohio and got a few tons of alfalfa to feed our cattle, and then put the manure on the land, would that inoculate the land?

Dr. Hunt: I do not know, but I believe it would work. I believe, however, it is better to inoculate with soil.

Mr. Powell: Give us a plan for testing the soil.

Dr. Hunt: Send a sample of soil to us and we will make the test for you. Send us two samples, one of the soil and one of the subsoil. Take the soil down to the plow line, say seven inches, and then take a sample of the subsoil below that depth.

Mr. Powell: Take it out with a spade or with an auger?

Dr. Hunt: Of course if one has an inch and a half auger it is desirable to use it. but all that is necessary is to take a spade and secure three or four pounds, both of soil and of the subsoil. Upon receipt of the sample we will send you a set of questions for you to answer.

Mr. Scott has brought in some samples of alfalfa. These samples were cut at the following dates: first cutting, June 24; second cutting, August 22; third cutting, September 25. This season has, of course, been much later than usual. Mr. Scott is in the audience and I would be glad to have him tell us about his experience with alfalfa.

A Member: Before you go any further, please give us your experience in new ground.

Dr. Hunt: I do not see any reason why that should be any disadvantage. In fact, I rather think it would be an advantage.

A Member: Any kind of soil that has been rich that is good for growing corn?

Dr. Hunt: I do not think it depends so much upon what has been in the field if it is the right kind of soil. Of course it is much better if the land has been cultivated for a year.

Mr. Scott will now tell us his experience with alfalfa.

Mr. Scott: Well, I don't know that I can say anything more about alfalfa than Dr. Hunt has said, but he was asked a question about sowing on new land. These samples I have here were sown in 1900 on limestone land that had been cleared and cropped one rotation with corn, oats, wheat, and a second crop of corn, and then it was sowed in alfalfa. I was fortunate in getting a very good stand; it has been mowed every year since that three times each year, and one year four times. That is the first cutting of June 24th; but it was ready to cut on June 1st. But at that time it rained almost every day here in the western part of the state, and there were no weather conditions to make hay, so we had to let it go over.

Mr. Critchfield: What county are you in, Mr. Scott?

Mr. Scott: Washington county, about twenty-eight miles west of here.

Now, in curing, the way I cure it is this: I let it lie about a day, then put it in shocks, and let it stand two or three days, and then change the shocks, putting the bottom to the top, and let it stand three or four days, according to the weather, and then I put it in the mow. I sowed it with barley; cut the barley off, and clipped it twice. Then in 1903, I tried it again, as Dr. Hunt said, sowing with oats, and the result was a failure. Then in 1906 I sowed a piece of about three acres in beardless barley, and I had a very nice stand. In 1905 it was too high to let it stand until next year. Probably some of you know that there are some varieties of alfalfa that seem as though would not grow up and make much stalk, and I came to the conclusion that that was what I had in 1906. The plants would come up just so high, and not get any higher. I plowed it in the spring, and limed it, and in plowing it, I found lots of alfalfa roots to the acre. But it did not seem as though alfalfa would grow there. But I sowed it in barley, and got alfalfa eight and ten inches tall. It has stood the winter very well so far but next year will decide whether it will stand.

Mr. Clark: How much hay did you produce per acre?

Mr. Scott: I had about six tons to the acre—a light crop I thought it.

I would like to ask Dr. Hunt what he knows about bluegrass getting in and choking the alfalfa?

Dr. Hunt: That does happen in land that is adapted to bluegrass.

Mr. Scott: What would be the best thing to do in a case like that?

Dr. Hunt: I would re-plow it and re-lime it and re-manure it, and sow it again. Bluegrass and other grasses are likely to

give trouble in many parts of the East, and that is why I emphasize the importance of putting on enough seed.

Mr. Stone: Now, you know that Joe Wing is a very truthful man. I heard him once tell about the penetrating effects of alfalfa. He said that in digging down into a tunnel out in the alfalfa country they found alfalfa roots 350 feet down in the slate rock. Then Joe got interested in the irrigating business out in Colorado. You remember when it came before Congress? Well, Joe had it on his mind, it seems, to such an extent that he dreamed about it at night, and one night he dreamed that he had died and gone to Hades—I suppose that is what you call it here—and the first thing he saw there was an old friend, and he said to him, "What is this, Dan? this can't be hell!" "No," says Dan, "It don't look like it, and there is some alfalfa growing over there." Finally along comes the Old Gentlemen, and Joe says to him, "Mr. Devil, is this the hot place?" and he says "Yes." "Then how is it that alfalfa grows here?" "Well," he says, "you irrigating fellows turned the water on me."

A Member: You talk about putting on ground that has been inoculated; would not that be a difficult matter?

Dr. Hunt: Oh, no; this matter of putting on soil is not a difficult matter, and it will work; it has been tried.

A Member: I think the greatest handicap in this country is the weeds. You cannot raise alfalfa where the weeds grow. Alfalfa should be grown in an arid soil, where weeds don't grow.

Dr. Hunt: When you have that condition, it indicates one of two things: either you have not the kind of soil that will raise alfalfa, or it has been neglected. Take the Dunkirk gravelly loam; we do not find any weeds there except such as will grow with alfalfa, as dandelion, for instance. Of course, where alfalfa does not grow, some thing else will grow. For instance, we take one piece of land and lime it, manure it, and inoculate it. The other piece we do not inoculate. What happens? In the one we get very good alfalfa, and very little weeds, and in the other we get a good crop of weeds, and very little alfalfa.

A Member: Do they have to lime and manure it in the arid country?

Dr. Hunt: No, sir; I am talking to you about the eastern humid section of the United States.

A Member: How long before you sow the seed do you put on the lime?

Dr. Hunt: It is desirable to apply about a week in advance of seeding. Harrow at once after applying and harrow again just before sowing in order to incorporate the lime thoroughly with the soil.

A Member: Will manuring and liming and inoculating prevent the weeds from coming?

Dr. Hunt: With certain soils at least the doing of the things mentioned will so stimulate the growth of alfalfa that the weeds will be kept in check.

Mr. Palmer: Caustic lime?

Dr. Hunt: I prefer caustic lime myself, a thousand to two thousand pounds to the acre; harrow it in. Let it lie there a week or ten days. Then when you get ready to sow the seed, harrow it again: then a day or two before you want to sow the seed, put on the soil from an alfalfa field; take care that this is not exposed to the sun, otherwise the organism may be killed.

Mr. Critchfield: Put it in with a drill?

Dr. Hunt: If you choose you may use the fertilizer attachment to a grain drill.

A Member: Where can you get clean seed?

Dr. Hunt: I can't tell you; I don't suppose that anybody who buys seed can tell whether they get clean seed or not. The best way to do is to have samples examined as previously explained. The Department at Washington has a staff that does nothing but analyze impurities in seeds and their germinating power.

Mr. Stone: It can be done by taking a box and covering it with a piece of netting, how many meshes I can't tell you; that will clean it.

Mr. Norton: Twenty to the inch.

Dr. Hunt: If you cannot possibly buy clean seed, you can clean the dodder out of it in this way, but the only way to make sure regarding the dodder is to have it tested.

A Member: Is there more than one kind of alfalfa seed?

Dr. Hunt: There is a variety known as Turkestan, but for Pennsylvania conditions it is probably not better than ordinary kinds. I prefer American grown seed to that from Europe or Chile. I would advise getting seed grown in Utah.

A Member: Get it from some western state where they can't grow weeds with it.

Mr. Stone: I think, Professor, that the trouble is that the land is not strong enough to grow alfalfa and a lot more weeds.

Mr. Snyder: Let me tell you my experience with alfalfa. I rented a farm, I think it was in 1892. There had been Polish people on it before, and they raised a great many potatoes. This man read a great deal, and he had been reading about alfalfa, and he sowed some alfalfa. I did not know anything about it, and the first year I didn't take the right care of it. We only mowed it twice. The second year I mowed it three times. We should have mowed it earlier, but the rest of the field was in wheat. We had it for six years right there, and the lower part of the field was in corn, and then I went to plow it up, and the roots were just like alder or hazel roots. I had one root that was three feet long. And then I put corn right there where the alfalfa had been. Right down where the alfalfa had been there was a flat rock, and I think the only reason that the alfalfa stopped there was because of that rock; it could not get through that rock. Well, since it was on the farm, I thought I would try it. I had a piece of new land, about four acres, and I sowed it in wheat, but I had no wheat and no grass; so when I told the neighbors my experience with alfalfa, they said if they were me they would try it there. So I planted it next year. I plowed it and I harrowed it, and about the 20th of August I planted alfalfa. It looked as if I were going to have a splendid crop of alfalfa. Then we had a terribly hard freeze, and the alfalfa was not good. Then I planted it in timothy, and have had that in ever since, but every once in a while we find alfalfa roots there yet.

A Member: The question was asked about seed; do you believe there is any difference in seed, whether you get it from the West or from the South or from the North?

Dr. Hunt: What do you mean by Southern seed?

A Member: The seed grown in warm climates.

Dr. Hunt: There is some seed grown in Texas, Utah, and Western Nebraska; then you can get it from Europe or from South America. I advise people to use North American seed, particularly the seed grown farthest North.

A Member: They have an alfalfa out in Minnesota that is known as the Grim Alfalfa; they sell it at fifty cents a pound. I don't like the idea of paying $30 a bushel for it. What do you know about it?

Dr. Hunt: If I were you I would not buy it. I don't think it is any better for Pennsylvania than that grown in Utah.

The President: The next subject on the program is an address by Dr. Carl W. Gay. Dr. Gay is not here, nor is Mr. Dietrich, the next speaker so we will have the pleasure of listening to Prof. Gilmore, who is on the program for tomorrow afternoon. But before we proceed with the program, we will be glad to have all you people come down here and get your badges, and pay your dollars; we need the dollars, and shall be glad to have you as members.

I will also appoint the following committees:

Auditing Committee: Mr. M. P. Shoemaker and Dr. Thomas Turnbull.

Nominating Committee: Mr. W. G. Powell, Mr. M. N. Clark and Mr. Henry Palmer.

Committee on Resolutions: Prof. H. E. Van Norman, J. B. Henderson, and Dr. Leonard Pearson.

I now have the pleasure of introducing Prof. Gilmore.

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## CORN PRODUCTION

### By Professor John W. Gilmore

Mr. President, Ladies and Gentlemen: This shall be simply a corn talk, not by any means an address, because I think we are interested chiefly in the practical phase of growing corn, and I want to go over some of the points that have a bearing on the production of corn, as well as on the seed quality of corn. I presume that I am quite right when I say that the question of seed corn for the farmers of Pennsylvania will be one of the most important they have to solve during the coming year. As I understand it, from reports that come in from all over the country, the corn that was intended for seed last year is immature and mouldy, and hence, the question of seed corn is a very important one, at least so far as its supply is concerned. Perhaps we can't help that now, but we must take into consideration some of the points that will help us to avoid it in the future. We will therefore take up the question of the corn for seed.

There are several important qualities for corn that is to be used for seed, and one of the most important, if not the most important, is maturity. If seed corn is not sufficiently mature when taken from the plant—not necessarily dry, but mature—it will not be of any service for seed for the coming year. This applies with emphasis to Pennsylvania corn. One of the greatest difficulties we have in Pennsylvania is to get varieties of corn that will mature under our climatic conditions. Many people have to depend on immature corn, because we are apt to get varieties that are too long maturing in our climate. Now, the conditions being such that we will probably have to buy seed corn this coming year, it is important that we should know something about these conditions, especially in regard to maturity. I will say more about this a little later, and then you can take up an ear, and note its quality for seed conditions.

I have here an ear of seed corn that I can open this way with my fingers, indicating that that corn is not dry enough or has not reached a state of sufficient maturity for seed corn. When you take an ear of corn like this, it shows very well that it has not been kept in a warm, dry place. I can't tell whether its vitality has been entirely destroyed, but it is quite certain that it will not be a good seed ear. When it is loose on the cob in this way, it either indicates absolute immaturity or that after its ripening period it has not been kept in a warm place, under conditions that insure its quality as seed corn.

One of the indications of immaturity is when the ear has a chaffy appearance, and when we find the grain set very short; that also shows it has not reached full maturity. Another indication of immaturity is when you look at the kernels, and you find them more or less wrinkled, and more or less dull yellow, indicating that the kernel, which has a high percentage of oil, has begun to deteriorate. So, altogether, we have a number of indications that will give us an idea of the maturity of the ear, and that is one of the most important features, because if immature, it will not give us a good crop.

The next question is vitality. We may have an ear of corn that is sufficiently matured and properly kept through the winter, yet its vitality may be very materially injured by freezing and improper conditions during winter keeping. I would advise you next summer to go through your neighbor's corn field, and estimate the standard of his corn. I don't advise you to go through your own, because you are going to have a good stand. Last year I went through a corn field that was planted by a very good farmer, a man who has good culture methods, and I counted three rows, each three hundred feet long, making nine hundred feet of row. This corn had been planted with a drill, and planted about a foot apart; at least that is how he intended to plant it. As a matter of fact, they were on an average about eighteen inches apart, making a loss of about thirty per cent in the stand of that corn. Another thing I found was that fully ten per cent were barren stalks, making altogether a loss of forty per cent; in other words, forty per cent of that field was not producing anything. Now, you go to Mr. Kelly who runs this hotel, and ask him what his idea of management is, and I presume he will tell you that he tries to have every room in this building filled by people who pay their bills. The same principle applies to corn fields. You want your fields fully occupied by corn stalks that bear corn. Yet this field that I have just spoken of is not very far from the average. Any one who has counted in this way will tell you that from forty to fifty acres out of every hundred is wasted—has no corn in it. And it is on this question that the vitality of the seed has its practical bearing. While

it is true that we can plant corn, every grain of which will produce, a great deal of the corn that is planted is very low in vitality, and it cuts down not only the stand, but the yield of the corn.

While I am on this subject, I will describe briefly, some method by which the vitality of the corn can be determined. You cannot tell by looking at an ear of corn what it will do in the same manner as you can determine its maturity. The best thing we can do is to test it and find whether we have a sufficiently productive seed before we plant it. That may be done in this way. You take a box eighteen inches square—you may make it larger or smaller, but I think that is about the size I would use—and about three inches deep; fill this box one-half to three-quarters full of clean saw dust; not dirty saw dust; wet thoroughly, and after it has been leveled spread over it a piece of cloth that has also been wet, such as this, which has been marked up into squares of about one and one-half inches. Now, if you buy your seed corn—I don't advise this, but if you have not enough I suppose you will have to buy it—pick from the ears a sample of grains from each ear, numbering your squares to correspond with the ears from which you have taken the grains, which are also numbered, and put in a suitable place to germinate. Take from five to ten grains out of an ear, turning it over, because it often happens that one side of the ear has more vitality than the other, according to the way the ear has lain. The upper side is often more dried out than the lower. Thus is becomes necessary to take it from all sides. Take grains from ear No. 1, and put them in square No. 1, and so on; then moisten it thoroughly, and cover it with some burlap bagging, and set it away where it will be sufficiently warm to germinate the corn. If you have a smokehouse, or something of that kind, which requires heat to be kept up, it will do very nicely; then let it stand for six days, and see what the result is. If it does not germinate more than four grains out of five, or eight out of ten, it will not be suitable for planting. The chances are that it has not sufficient vitality to produce a good crop.

I have been looking over the average production of corn in Pennsylvania for the last forty years, and find that it runs somewhere between thirty-two and forty bushels per acre. Now, it is possible to increase that yield by adding any assistance in our power that will enable it to do its part. We find that the corn is usually planted three stalks in a hill, three feet apart, and if we take care to see that the grains we plant are sufficiently full of vitality to bear, we can very materially increase our production by simply paying attention to the vitality of our seed corn. According to the standard of Pennsylvania production, this question of vitality it not to be neglected.

Another important point is productivity. There is just as much difference between the productivity of the different corn plants as there is between cows. Every grain of corn is capable of a degree of productivity, just the same as an animal is. That is a quality for which you have been breeding live stock; particularly in the last fifty years great stress has been laid upon it, but no attention was paid to corn until the last few years. There are certain things in regard to this on which I will not enter now; suffice it to say that oats, clover, wheat, timothy, corn and other crops are just as capable of improvement by the same general methods as horses or cattle or sheep are, so that we have to pay attention to the productivity of corn. You are all aware that there are certain grade cows which will produce as much milk and butter-fat during the course of the year as a good many highly bred registered cows; you are also aware of the fact that the progeny of these grade cows are not so likely to produce as much as will the progeny of the registered cattle, wherefore the grade cows are not as valuable as the registered cattle. It may not be possible to produce the pedigree of an ear of corn or of a grain of wheat, but we can introduce principles of breeding into our crops in that respect just the same as we can into our animals. It is with this in view that we want to look to the productivity of our ears of corn. We don't want stalks that are sterile.

Now, I want to say something about the introduction of seed corn from some other locality. We hear a good many farmers say that seed corn runs out, oats run out, and potatoes run out, and it is necessary to go into some other locality to get the seed. So it will be, if you allow them to run out. If you buy an Oxfforddown from our friend Mr. Stone, and leave him out in the wind and the weather, and pay no attention to him, at the end of the year you will not have the same quality of sheep that he was. The same thing applies to corn. If you get good corn, and put it into poor soil, and give it poor cultivation, it is probable, of course, that it will run out. The same care that you men exercise in breeding cattle, and taking care of the individual, and

Then I come to the last, percentage of keeping up the standard, must be exercised in keeping your farm crops up to the standard required. We must have ideals in our minds, and keep them constantly before us. When a man is diligent in caring for his crops, putting them in suitable soil—Prof. Hunt has just shown us how it is possible to grow alfalfa under suitable soil conditions, and the same thing applies to other crops. If we put our crops in the best soil possible, give them the best culture possible, and have an ideal of what we want and keep it before us, there is no reason to believe our crops will run out. So when we import seeds from other localities, it is necessary to get that which is best suited for our purpose and environment. When we send to Iowa, Ohio or Maryland for corn, when we get Reid's Yellow Dent and Leaming or Boone County White, it is not so much these varieties that we want, as the environment in which they grew. Consequently the best thing for us is to provide our own seeds by doing everything in our power to produce them.

Now, I want to say something about improving our corn, and what I shall say will apply particularly to these Pennsylvania varieties. I presume that corn has been quite as instrumental in improving our animals as anything else. But most people fail in their estimate of corn and other crops because they do not take into consideration all the elements of excellence and quality that may be necessary to be considered. For instance, you go into the corn crib or potato cellar, and find an excellent specimen; you say it is excellent because it is healthy, large, a fine looking specimen in every way. Now, if you select that specimen on one of these factors, the chances are that by planting that specimen you may not succeed in producing what you desire. The fact is, you should take into consideration other factors.

The score card, while imperfect in many respects, yet serves to emphasize some of the features of a good ear of corn. When these various features are given their relative values and then considered along with yield and environment a good basis for improvement is established.

| | |
|---|---|
| Uniformity of exhibit and trueness to type | 10 |
| Market and seed condition | 10 |
| Shape of ears | 5 |
| Color—Kernels | 5 |
| Cob | 5 |
| Tips | 5 |
| Butts | 5 |
| Length | 5 |
| Circumference | 5 |
| Kernels—Shape | 10 |
| Uniformity | 10 |
| Furrows between kernels | 5 |
| Space at cob | 5 |
| Percentage of grain | 15 |
| | 100 |

For uniformity and trueness to type, we give 10 points; while this does not necessarily apply to the excellence of seed corn, we all like to look at beautiful things, and I claim there is just as much beauty of its kind, in an ear of corn of good length and straight rows, as there is in anything else; therefore it is quite as proper to show a beautiful ear of corn as a beautiful picture. Therefore we give ten points for uniformity and trueness to type. Next comes the market and seed conditions, which I have just referred to. Of course it will be impossible to judge it strictly—I propose to use this score card in judging the exhibits—on these points, because most of the corn has been recently taken from the crib, and in looking it over I find very few ears that are dry or have the market features in prime condition. We give that 10 points. So far as the shape of the ears is concerned, we only give it 5 points. Ears differ so much in shape, but, in a word, we like an ear that is as nearly cylindrical as possible. Still, it can be said from actual experiment in the field, that there is no relation between true cylindricity and the highest yield. It has been determined at the Ohio Experiment Station, and at the Illinois University that the largest yield comes from slightly tapering ears. The ear may be slightly tapering, medium tapering, or cylindrical, but the more nearly cylindrical it is the better. Then comes color, 5 points. Frequently the color shows whether the breeding has been poor, or otherwise. A yellow corn should be strictly yellow, and the color of the kernels should be uniform. Then comes the cob, 5 points. Then the tip, 5 points. Not much has been said about the excellence of the tip, and yet a poor tip detracts from an otherwise good ear. I would like to call your attention to these three ears; one of them is very good, one medium, and one very poor. Likewise I hold in my hand two ears that illustrate two qualities of tip measurements. The one is well filled and rounded out, while the one on the left is very poorly filled out at the tip. Now, in judging, this will, of course, be scored, but I want to call your attention to the fact that excellence of yield and vigor does not necessarily mean excellence of tip. Now, you will readily notice that the long ear is the more desirable of the two. It has more corn on it. I believe it is easier to increase the yield of corn of this shape than it is to increase the length of this particular cob. It it possible to over-emphasize the appearance of the tip, and leave out the other consideration; nevertheless an excellent tip looks well.

Then we come to the butt of the ear. Here we have also a quality that is as important as the tip. Here, for instance, are two ears, and I can show you again on them, the small, medium and large kernels. If you will look at this ear, you will see it well filled out at the butt, with the rows, regular, and straight up to the end. We want to take this fact into consideration, because it indicates strength and vigor of growth, and it also bears some grains that look as though they might be valuable for feed.

Then we come to length; we give this 5 points, because it is a factor that is quite important. Here we can turn again to the ear; when the length is in proper proportion it makes a beautiful ear. Take the Dent Corn; here we have a variety that has a circumference of two inches from the butt, and is 75 per cent of the length, and it is a good looking ear. I would pay more attention to the length than I would to the excellence of the tip, but I think with better methods of corn culture, we can improme them both.

Mr. T. E. Orr, who was a judge of poultry was talking about the hen. He had her standing on the table in front of him, and was talking about her good qualities, when some one, who evidently was not acquainted with her, or with the good points of a hen, wanted to know what were the factors of good appearance in a hen; he thought for a moment, and then said, "if she fills your eye, is perfect in her shape, in her proportions, then there is no doubt of her excellent qualities." So it is with the ear. The ear which shows a proper proportion between circumference and length and is well filled out, leaves little doubt of its good qualities. On the other hand, the ear which, while it may have a reasonable circumference, shows lack of form in some way, and lack of strength and vigor in growth. Take this ear, for instance; it is a little too long for its circumference, and it has not the most desirable form.

Next comes the shape of the kernels. Now, the shape inidcates two things, either weakness in growth, or vigor. In the first place, we want them fitted as full as possible; this means that they are not too long, but are more or less square, as in this ear. Take this ear of Dent corn; as we look at it from all sides we see it slightly tapering toward the tip, with rows well filled out and close together. It is not desirable to have the rows dovetailed together, but we would like them to run well together tapering. Now, if it tapers when you look at it in this way, it indicates poor seed qualities. Sometimes you can tell something about the seed quality of the corn by the shape of the kernel. You want to avoid the shoepeg shape of the kernel. They are slow in their development, and have small kernels. Likewise, you want to avoid furrows between the kernels. That happens sometimes because of the shape of the kernels, and sometimes because of the size of the cob. Of course, there is the famous "Hickory King" corn of the South, which is characteristic in that respect, but in all other respects this wide row or furrow between the kernels should

be avoided. Here is an ear that is very irregular, and here is one that shows a very small kernel. Now, this is important, because most corn is planted with a planter, and irregularity in size and shape will almost invariably result in irregularity in planting. The idea is to have it uniformly planted. If you want three stalks to a hill, you want three, and not five in one hill and three in another, and so you take an ear of this kind, while it may be vital and productive, it is a poor seed ear, because it would plant irregularly.

Then I come to the last percentage of grain, 15 per cent. Now, some of the score cards that are used in Iowa and Nebraska do not use this; they speak of the size of the cob, and so on. But for Pennsylvania it is better to use this. In this part of Pennsylvania we do not, as a rule, want a large cob, because a large cob indicates a long growing period, and also because a smaller cob is more easily dried out. With the large cob you have a variety that requires a long growing period, and, in addition, it is difficult to dry out. When you have a smaller cob, it indicates a shorter growing period, and a larger percentage of corn, and a shorter time for drying out. This question of maturity and drying is one of the greatest importance. In fact, I think the poor condition of our seed corn this year is due to slow growth, and drying. From Reid's Yellow Dent and Leaming, we should expect from 84 to 86 per cent of grain. So when we take into consideration all the points here noted, and the values given here in regard to the excellence of corn, and follow up these points in our selection of seed corn, there is no danger of our crop running out.

Now, I know that the time is getting short, but I would like to say just a word or two in regard to the selection of corn. A good many people have selected their corn for a number of years from the crib after the corn was husked. Now, there are two reasons that render this method not the best. One of them is that the selection has not been completed before the freezing weather sets in. Corn that is intended for seed corn, should not meet freezing weather until it is quite thoroughly dried out—not necessarily dried by artificial heat, but it should be thoroughly dry, and then freezing does not hurt it so much, but the danger is that if it is not selected before freezing weather, and thoroughly dried, the vitality will be destroyed. Another reason why selection from the crib is not the best is: you will look into the crib and see some good-looking ears. You do not know anything about that ear. You do not know whether it grew on a stalk in a hill by itself, or whether it grew with other stalks. What you want to do is to get for seed corn, the corn that will do the best in the environment in which you expect to plant it, and you know by experiment that the standing quality of that corn is hereditary. It has been definitely proven that a large percentage of stalks that have fallen down produce the same kind, while stalks that stand up before the wind produce their kind. Now, in selecting out of the crib, you do not know anything of the conditions under which this corn grew. If you select the corn for seed before the harvest, you will be able to see under what conditions it grew, and select it from a good stalk. You should see that the stalks are good, that the ears have a good appearance, are well filled out, have good tips, and in fact, have all the points mentioned on the score card. These ears selected from the field do not always have the good appearance of the ears selected from the crib on their appearance alone, and yet experiments for two consecutive years showed an increase of seven bushels per acre over those selected from the crib. And the same thing applies to the potato. If you want to keep up the quality of your potato crop you will select your seed potatoes from the hill rather than from the cellar. In selecting from the cellar, you don't know in what kind of a hill that potato grew, whether it was one potato on a vine, or whether it was one of many, or even whether it was the one big potato among a lot of little ones on the same vine. Consequently, selection from the field is best to follow, for educational value as well as for the greater possibility of excellence of material and yield, and with that I shall close.

The President: Are there any questions you would like to ask Prof. Gilmore?

A Member: How do you select the seed corn, and when?

Prof Gilmore: When you go into the field while the corn is still standing, just about the time you are ready to cut it, but before you cut it. Then mark these ears so that when the season approaches you can take them in out of the weather, and dry them perfectly.

Mr. Snyder: I always select my seed corn when I husk it, and haul it in. I always have a box on the wagon, and select it as we go along, and put it away.

Prof. Gilmore: That is all right so far as is goes, but if you select it at the time of husking, you don't know where that corn grew, or how it grew.

Mr. Snyder: Well, I tried the other way, and I thought it took too long.

Prof. Gilmore: It takes fifteen ears of good corn to plant an acre, and if you can improve your yield by 40 per cent, I think it will pay you to take the time to select them.

A Member: I was thinking of sending to West Virginia for my seed corn. I wish to get the kind that grows closest to us.

Prof. Gilmore: That is very practical. In getting seed corn, I would advise getting it from as near to your own environment as possible. Get it as far North as possible. If you send to southern Ohio you would get a variety that is of longer growing period.

Mr. Wagner: The chances are that it would mature too late in Pennsylvania.

Mr. McCann: I want to raise a point with regard to the distance. You advocate having the stalks three feet apart?

Prof. Gilmore: If you have your stalks a foot apart and your rows three feet apart, you will have the same number of stalks to the acre as you will have to check-row it for three stalks to a hill.

Mr. McCann: The best crop of corn I ever raised was planted sixteen inches apart and nearly four feet the other way.

Prof. Gilmore: You are from Chester county?

Mr. McCann: No, sir; I am from Washington county.

Prof. Gilmore: Down in the South they plant farther apart than that when they plant for ensilage, but we do not plant so far apart.

A Member: I want to be understood; I am glad that I am as far East as I am, but I would like to ask this question: Do you know what percentage of yield per acre is gotten from this point East as compared with the middle West? Do we raise as much as the middle West?

Prof. Gilmore: Our statistics are for corn in the ear, while in the West they base their estimates on shelled corn, but I think that, if anything, Indiana and Illinois are a little ahead of us.

The President: We have a full program tomorrow, and trust you will be on hand in time. We now stand adjourned until 9.30 tomorrow morning.

## THURSDAY, FEBRUARY 6, 1908, 9.30 A. M.

President Norton in the chair.

The President: The meeting will please come to order. We will take up the first subject on the program, an address by Dr. H. P. Armsby, Director of the Institute of Animal Nutrition, Pennsylvania Experiment Station, on "Balanced Rations for Cattle." I have the pleasure of introducing Dr. Armsby.

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# BALANCED RATIONS FOR CATTLE

### By Dr. H. P. Armsby

Mr. President, and gentlemen of the Association: It is a very great pleasure to me to be here and meet this large gathering of the Stock Breeders of Pennsylvania, and to learn of the very interesting meetings which I understand you had yesterday. When I left home yesterday, the thermometer was down somewhere about zero, but as soon as we came across the mountain, and approached Pittsburg, it began to grow warmer, and I understand now that it was the warmth engendered by your Society yesterday. My subject is an old one, but I hope to suggest at least a little modification in one way of looking at it. I shall consider it especially in its relation to the feeding of beef cattle.

We all know in a general way what is meant by a balanced ration, but we shall, perhaps, get a little more definite understanding of it if we consider how the animal machine which we term the body works. We are aware that the working machinery of the body is composed of what the chemist calls "protein." Now if I were wise enough I could stand here all the morning and tell you what the chemist knows about protein, but for our present purpose it is sufficient to say that protein is like the white of an egg or washed lean meat. It contains the element of nitrogen, and it makes up the working machinery or the structural part of the body. Then, in addition to that, we have more or less fat in the body, which is not essential to the working of the body, but constitutes a reserve of force or energy. The food that has been given to the animal in excess of its immediate needs has been turned into fat. Of course there are other things in the animal body, but these two are the essential ones, the protein making up the working machinery, and the fat, which may be called reserve fuel.

Now, there is a pretty close analogy between the body of a man or an animal and a gasoline or steam engine. They are not exactly alike, of course, but in one respect they are very similar. They are both machines for the conversion of chemical energy into work. In the steam engine, for example, we burn coal under the boiler, and by various devices we convert the resulting heat into work, which we apply for our own purposes. In case of the gas, alcohol or gasoline engine, the transformation is more direct. The fuel is burned in the cylinder of the engine and its energy converted in this way into the motion of the piston and so into work. In much the same way the animal burns fuel and produces work. The fuel is its food—corn, for instance. I remember that several years ago the farmers in the Middle West were burning corn for fuel, because the price was so low that they could not afford to haul it to the station. They might also have burned the corn under the boiler of an engine and so used it as a source of energy for the performance of work. Now, when we feed corn to the animal, that corn is burned, just as truly as fuel is burned under a boiler, and we can utilize its energy in the shape of work done by the animal. Moreover, if we do not utilize it all in this way the animal will store the surplus in the shape of fat and meat against some future time of need. Then, when we slaughter the animal and eat the meat, we are using this stored up fuel to drive our own bodily machinery. We, ourselves, cannot eat hay, or bran, or cottonseed meal, but we have converted them into beef or pork, or mutton or milk, which we use as a source of energy to our own organism.

Now, if we are running a gasoline engine on our farms to do our work, we must have iron and brass and babbitt metal and similar materials to keep that engine in repair. The same thing, exactly, is true of the body of the animal. It wears out constantly, and must have repair material continually. Now, as I have pointed out, the chief constituent of the body is protein, and to repair it we must have protein. We can no more keep it in repair by giving it starch or sugar or fat than we can keep a gasoline engine in repair by giving it more gasoline. These things furnish fuel, but they cannot be used to make repairs. It seems that almost anything the animal can digest can be converted into fuel, but to build up and repair, we must have protein material.

As you know, I have been interested during the last few years, in studying some matters relating to the supply of energy to the body, but I propose to speak to you this morning of the necessary supply of protein material to the body.

We are accustomed to speak of a balanced ration as one which contains protein and fuel material in due proportions, and we make calculations showing what the nutritive ratio should be. I think it would be better if we looked at the matter in a different way. A ratio is always a difficult and misleading thing to deal with, and I think that instead of figuring upon the relation of protein to carbo-hydrates, it would be better to figure on the absolute amount of protein required, that is the actual number of pounds. In running a gasoline engine, a certain amount of repair material is required. It does not make so much difference whether much or little gasoline is used, you have to have about so much repair material anyway. Now, this is even more true of the animal. Under any

given condition the working machinery of the body wears out at about the same rate whether the food supplies a moderate amount or a large amount of fuel material. There is this difference between the animal and the engine, however, that the former can use surplus repair material for fuel. The repairs in the animal body can only be made with protein, but protein can also be used as a source of energy. It, therefore, does not make any particular difference what proportion of protein you have in relation to the fuel material, provided you have enough pounds of protein for repairs. Take the case of a thousand-pound steer standing quiet in the barn; he will need about half a pound of protein a day to keep his bodily machinery in repair. Now, provided you give him a ration that contains half a pound of digestible protein, it does not matter so much whether you give him only that half-pound or whether he gets a pound, or two pounds. He must have the half-pound of protein. If you give him a pound, he will have half a pound which he does not need for repair and which he may use as fuel in place of an equivalent amount of carbo-hydrates or fat. The one ration will do as well as the other, so far as protein is concerned. The second one will give him a little bit more fuel material. It is not necessary that there should be some exact proportion of protein, say one part to five and a half or six parts of carbo-hydrates, that is, it is not necessary in the sense that the animal cannot use the ration unless it is just in that ratio. What is necessary is that an animal shall have enough protein to supply repair material and normal growth. If he has that, it does not matter so much what you add for the fuel material. Ordinarily, of course, the latter is chiefly carbo-hydrates and fat, but any protein in excess of that needed for repair and growth also serves as fuel material. The whole matter of the balanced ration, then, resolves itself into this: that the food must contain at least a certain minimum amount of protein, varying with the purpose of the feeding, and must supply enough fuel material to run the animal and allow a proper excess for the production of fat if that is desired. In practice, however, protein usually costs more than carbo-hydrates and fat and therefore we try to use as little protein as possible. but it is not the ratio of protein to the other materials which we have to consider as much as its absolute amount.

It has been shown that in a ration low in protein, and with a large proportion of carbo-hydrates there will be a little loss of digestibility, and it has been advised on that account that it is well not to have more than eight or ten parts of carbo-hydrates to one of protein; that is, a nutritive ratio, 1:8 or 1:10. In general it is not wise to curtail in protein at the expense of digestibility, yet it is easy to imagine circumstances under which it would be more economical to suffer some loss of digestibility than to pay excessive prices for protein. Ordinarily, however, unless we go to extremes in reducing the protein of our rations to the lowest possible limit, there need be little apprehension of loss on account of impaired digestibility.

The point of view having been thus indicated, we come to the question of the specific protein requirements, particularly of beef cattle. This question we may sub-divide into three; first, as to the amount of protein required by young, growing cattle: second, the amount of protein needed for mature cattle; third, the amount required for cattle at the age at which they are usually fattened in this country.

First, young and growing cattle: Growth, of course, is the increase in size of the body; that is to say, the body is increasing its working machinery, therefore it calls for a liberal supply of protein, because the working machinery is made up of protein. Consequently the demands of young, growing cattle for protein are larger than those of maturer animals, and they have the capacity to store a larger amount than the maturer animal. Of course, it is not fair to compare the amount which a one hundred pound calf stores with the amount which a thousand pound steer stores away, but if we take a calf of about a week old, we find that it will store in one day in its body protein amounting to about two and one-third per cent of what it already has in its body. That is, if there were ten pounds in his body the calf will store up every day a little less than a quarter of a pound. At that rate, it would double its stock of protein in forty-two days. It might not exactly double its weight, but it would double the weight of its working machinery. When the calf is three weeks old it is able to add 1¾ per cent to its protein stock in one day, which would be equivalent to doubling its amount in fifty-eight days. At two months, it would require about 150 days, to double the amount of protein in its body, storing up a little over two-thirds of one per cent a day. A steer 2½ years old would store only about 0.07 per cent, requiring, at this rate 740 days to double its stock of protein, while a week old calf would do it in forty-two days. In other words, the capacity for storing protein is highest in the young animal and decreases as the animal grows older, and consequently the protein requirement of the young animal is likewise high.

If you have a young pig, and you feed him largely on starchy food, like cornmeal, the chances are that you will not give him enough protein to supply the material for growth, and it will tend to a production of fat, rather than meat. These are facts that are fairly well known. The protein requirements in cattle, as in other animals, are high in young animals and decrease as they grow older.

At the other extreme stands the mature fattening animal. Such an animal needs sufficient protein to keep his bodily machinery in repair, and probably very little, if any more. As I said before, such an animal needs something like half a pound of protein for repair material—certainly no more. Some experiments have indicated as little as one-third of a pound, but half a pound is probably the safer estimate—corresponding to a nutritive ratio of about one to fifteen. The mature fattening animal is producing fat, and simply keeping his bodily machinery in repair. He needs, therefore, chiefly material to make fat, and very little protein.

Most of our beef producers, however, do not fatten mature animals, but animals approaching maturity, and the tendency has been to fatten these animals for the butcher at an earlier and earlier age. I suppose that the standard would be about two to two and a half years old—practically what we call a two year old. There has been some so-called "baby beef" produced, but not a very large amount, up to the present time.

Now, animals of that age occupy an intermediate position. They need less protein than a very young animal, and more than a mature one. Unfortunately, we have no accurate data as to the lowest amount of protein required by cattle. It is a question well worth investigation, but it has never been gone into in a scientific manner. It is, however, possible to take the results of some of the trials at our experiment stations and get at approximate figures. For instance, suppose we feed to a lot of two-year-old cattle a ration containing a pound and a half of digestible protein per day, and to a second similar lot a ration supplying two pounds of digestible protein per day. If better results are shown on the two pounds a day, all other conditions being equal, we can safely conclude that a pound and a half of digestible protein was not enough. In this way by comparison we can get approximate figures, by which we can estimate the least amount of protein required. This is an empirical way to determine the matter, but it is the best we have now.

Approximate protein requirements, per 1000 pounds live weight:

| | |
|---|---|
| **Cattle.** | |
| Maintenance | 0.5 |
| Meat Production: | |
| Age 2-3 months | 4.0 |
| Age 3-6 months | 3.0 |
| Age 6-12 months | 2.5 |
| Age 12-18 months | 2.0 |
| Age 24-30 months | 1.5 |
| Mature | 1.0 |
| **Sheep.** | |
| Maintenance | ? |
| Meat Production: | |
| Age 5-6 months | 3.5 |
| Age 6-8 months | 3.0 |
| Age 8-12 months | 2.5 |
| Age 12-15 months | 2.0 |
| Age 15-20 months | 1.5 |
| **Swine.** | |
| Maintenance | ? |
| Meat Production: | |
| Age 2 months | 3.0 |
| Age 4 months | 2.75 |
| Age 6 months | 2.50 |
| Age 8 months | 2.25 |

Now, on this chart you will find approximate figures showing the amount of protein required for cattle and other meat producing animals. You will understand, please, that these are approximate figures: they don't mean that a two to three months' old calf must have just exactly four pounds of protein per thousand pounds of live weight, but that it should be somewhere near that. Then, as the animal grows older, the amount of protein required diminishes somewhat in proportion to these figures. I emphasize that, because it is unfortunate to get the idea that it must be followed exactly. It is not a scientific deduction, but the expression of the results of practical experiment. It is a general guide, and not something that must be followed to the very letter. But I don't want you, either, to go away with the idea that it is of no particular importance. It is of the very greatest importance that we supply the proper amount of protein, as I will show you in a few minutes.

Now, since it is of such vital importance that the animal shall have a reasonably liberal supply of protein, where shall we get it? The ordinary feeding stuffs of the farm, particularly corn and corn fodder, timothy hay and straw, are deficient in protein. For mature animals they probably contain enough, but for growing animals we find we cannot figure out a ration in this way that will supply enough protein. We must, therefore, get some kind of material richer in protein to go with the material that grows on the farm.

Now, there are two ways in which we can supply this material: one is to go out into the market and buy feeds rich in protein, like oil-meal, or bran, or gluten feed, or cottonseed meal, or brewers grains. This is a method which has been practiced to a considerable extent, and which has been recommended very strongly, especially, perhaps more by those who, like myself, have been in the habit of looking at the matter from a scientific viewpoint, rather than a practical one. The other is, to try to raise it in some way on the farm; that is, to try to get the protein out of our own crops, instead of depending on the market. Now, either is a good way, and its practicability in any particular case depends on the conditions. Under some conditions it may be cheaper to buy your protein than to raise it, and under others, cheaper to raise it than to buy it. Of course, in raising the nitrogenous crops like soy beans or cow peas, it is necessary to take into consideration the effect they will have in improving the soil, but it is after all a question of relative cost, into which I will not enter at this time. Instead, I want to present a few figures from actual experiment to show that it is profitable, in fattening cattle for the market as they are usually fattened in this country, to supply more protein in the ration than is usually given and that this may be done in either of the two ways I have mentioned.

The Illinois Station reports in their Bulletin No. 83 their results in fattening carload lots of steers. Lot 1 was given corn, timothy hay and corn-stalks—an ordinary feed, rather poor in protein. They gained 1.86 pounds a day. Lot 2 was fed corn with clover hay in place of timothy, and that lot gained 2½ pounds a day, on the average. Lot 3 was fed corn, gluten-meal, timothy and stover and gained 2¼ pounds a day, instead of 2½. For every hundred pounds of grain fed. Lot 1, getting corn, timothy and corn-stalks gained ten pounds. Of the other two lots, the second one, with the corn and clover hay, gained thirteen pounds for every hundred pounds of grain, and the third lot, on the gluten feed, gained 13.4 pounds for every hundred pounds of grain. The first lot gained 7.6 pounds, and the other two 9.3 pounds per hundred pounds total feed, they being practically the same. The report says that the gluten ration gave a higher and a quicker finish than either of the other two, and even at the higher prices paid, the gluten was a trifle the better investment. The corn, timothy hay and corn-stalks did not contain enough protein, and when this lack was supplied, either by the use of clover hay or of gluten meal strikingly better results were obtained, and the clover hay and gluten-meal seemed to be about equally efficient.

At the Nebraska Experiment Station one lot of two-year-old steers were fed with snapped corn and prairie hay, and gained 1.2 pounds per day. Another lot was fed on snapped corn and alfalfa, and gained two pounds per day. The first lot gained 12.7 pounds and the second 21.7 pounds for every

hundred pounds of grain consumed, or the first lot gained four and one-third pounds for every hundred pounds of total feed they ate, and the second lot 6½ pounds.

In the same series of experiments, they tried adding nitrogenous concentrates like oil-meal or cottonseed meal, and it was found, just as in the Illinois experiments, that there was a marked advantage, although the gains weere not quite so cheap as with the alfalfa.

They tried still another lot, for which I have not the figures here, using one-half alfalfa hay, and one half corn fodder. They got just as large a gain, and a cheaper gain than with the alfalfa alone. The corn fodder was cheaper than alfalfa, and evidently a half ration of alfalfa furnished all the protein that the animals needed.

I want to call attention to some results recently published by the Missouri Station in Bulletin No. 76, and I want to recommend the study of that bulletin to those of you who are interested in the production of beef. It contains an account of some experiments conducted at the Missouri Station. Now, the point I want to call special attention to is one of the results in this matter of using roughage. In the first place, they point out that by using foods like alfalfa, cow peas, or clover, they can get their animals to use more coarse feed, thereby diminishing the cost of the ration. This larger consumption of coarse feeds, however, does not prevent the steers from consuming a full grain ration. Indeed, rather more grain can be fed with a legume hay, than with timothy or corn stalks. Finally, as regards the cost of production, they estimate that one bushel of corn fed with timothy hay will average 4.93 pounds of gain—practically 5 pounds—while one bushel of corn fed with clover and cow peas will produce 6.6 pounds gain, a difference of 1.6 pounds of beef gained for each bushel of corn by using it with the nitrogenous forage crops as against timothy. "Rating this gain at the low price of 5 cents per pound, this means that the feeder is getting 8¼ cents per bushel more for his corn by combining it with some such hay as clover or cow peas than when it is combined with good timothy. If one-fifth of all the corn produced in Missouri were fed to cattle, the increased profits from combining it with clover or cow peas as compared with timothy would amount to $2,500,000.00 each year.

"The profit is not all, however, in the inincreased gains secured by the use of legume hays like clover and cowpeas, for, in addition to this, the steers get fat quicker, fatten more uniformly, and show at the end of the feeding period a higher finish and carry more bloom and are altogether smoother. By reason of these facts they will sell from 10 cents to 25 cents per hundred more on the market, or will add from $1.25 to $2.50 to the value of each steer so fed over and above the economy in the gains already referred to.

"It may be further stated that the hog following the steer does better when the steer is fed on a legume hay than when the roughness is material like timothy, prairie hay, corn stover, or straw.

"Thus we have a four-fold profit from the use of one of these legume hays: First, in the form of cheaper gains; second, in the form of more rapid gains; third, in a higher finish and better selling quality; fourth, in the form of increased hog gains."

Of course, as I pointed out earlier, the effect of these leguminous crops on the land must also be considered. I don't mean to recommend this course as the best under all circumstances, but it is one of the two ways of profitably fattening cattle, and I believe that this question of the increased growth of leguminous crops is well worth considering as a means of supplying protein. The protein requirements of growing and fattening cattle certainly demand careful consideration. I simply want to impress upon you that it is profitable to supply a reasonable amount of protein so as to utilize the capacity for growth of these animals, and that under most conditions it would probably be to the advantage of the producer—the cheapest way of producing it—to raise this protein in the form of alfalfa or clover or other forage crops, rather than buy it at the ordinary market prices.

The President: Are there any questions you would like to ask Dr. Armsby? Please ask them at once, for we have a full program. I know the Doctor will be willing to answer them.

A Member: What is the effect of dried distillers' grains, as compared with dried brewers' grains, after the distiller has taken from the grain the rye whiskey?

Dr. Armsby: I don't carry the figures in my mind. In general, the rye grains are a little richer in protein than the brewers' grains, but I should say that there is probably not a great deal of difference.

The President: Any more questions? If not, we will proceed with the program. The next subject on the program is "Fitting Sheep," by Dick Stone. Mr. Stone will now talk to us.

Mr. Stone: I want to thank all the breeders and farmers for the treatment I have received at their hands. I feel like the old man some years ago I met in the lane near my house, stuck in the mud, and he couldn't get out. Of course, I unhitched my team and pulled him out, and after I had him out, the old man offered me some money; but, of course, I wasn't used to that; then as we parted he said, "My friend, I hope to God I'll see you in the same condition some day."

A few days ago I had a little talk with the farmers in our own county, and, of course, those papers always try to make the best of everything, so they said it was a model speech. Of course, when I went home, I swelled up a little, and I said to my wife how proud she ought to be to have such a man. Then my little boy, who was back in the corner, studying his lessons for the next day, piped up and said, "Papa, do you know what the definition of a model is?" Well, of course, I had to say "no." And then he said, "It is a small imitation of the real thing." And then I didn't feel quite so big over my speech.

And now, if you will bear with me a little while, I will get up and speak my little piece. After listening to the gentleman who has just preceded me—I don't understand what he said, having never been to school, but he tells me that they do here, and everywhere else, even down to Missouri, where they do the feeding—I'm a little timid about getting up, but if you'll bear with me just a little while, and then ask questions—for if there is any place in the world that I shine, it is right there, in answering questions.

# FITTING SHEEP FOR SHOW AND FOR MARKET

## By Dick Stone

A Show Flock is among the most interesting exhibits found at our State and county fairs, and shows the world over. And to the shepherds and many others it is a fascination. As I have often remarked the fitting of stock for exhibition often means a sacrifice of the cream of the flock. Nevertheless were the practice of showing discontinued it would be a source of loss to the live stock industry for the reason that the breeders would lose one of their best guides to type. Hence the show yard is a necessary evil. To properly feed and fit sheep for exhibition requires considerable skill. Where indifferent methods of fitting are employed not only are the animals' chances of victory poor, but their reproductive organs are liable to suffer in consequence. In feeding for the best results I feed concentrated foods, such as oats, oilmeal, peas and corn. Also the most succulent appetizing nutritious and cooling rations such as cabbage, rape, kale, turnips, mangolds and carrots, and these with the utmost regularity. After the preliminary or outdoor fitting the show yard candidates are housed during the heat of the day and allowed out in the paddock only during the night chiefly for exercise. Some little time previous to starting for the shows they are blocked out and trimmed and made very pleasing to the eye; after trimming they are blanketed with the purpose of keeping the fleece clean and making it compact and smooth. I always use a little color by mixing yellow ochre and burnt umber. Mix it with water and rub it into the fleece. It makes the sheep look fresh and nice. The question is often asked, How much do you feed your show sheep? The question is answered by saying we give them all they will eat, and sometimes a little more. In feeding our show lambs while they are sucking their mothers we make a creep for them to run in a little lot by themselves and feed the best we have—ground oats, ground corn with a little oil cake sprinkled with a little sugar. You cannot get your lambs too fat but you must watch your older ones or you will have too much blubber. The question is often asked me, when do you select your show sheep? Almost as soon as they are born, and if we never made any mistakes in our selections what a nice time we would have. I handle my show sheep as much as possible, as handling them makes them tame and manageable; although sheep are supposed to be a very dumb animal, there are a good many things that they learn very rapidly and one of them is how to stand out properly and how to follow the shepherd. A sheep is best made to stand squarely and naturally by putting the left hand under its lower jaw and the other on its loin and gently pressing it. As a natural consequence it spreads out its feet with a view of supporting the extra weight on its body. It takes but very little time for a sheep to learn what is expected of it and to acquire the proper pose and with your sheep properly fitted and with the expert judge you will come home with a good number of ribbons.

There is a vast difference in fitting for show and for market, one is only the fair and to be kept for breeding purposes, and the other is to be fitted for the market to be slaughtered. In the first place I would make my selection and it would be lambs raised somewhere in the West, sired by good pedigreed Down rams or some good western bred ewes with as much as possible Down blood in them. I would have them shipped in some time in August and let them run on the blue grass pastures and on the young clover as soon as they were rested. I would begin to feed about one-fourth of a pound of corn and would keep on by easy stages until they were eating one pound and a half of corn per day until about the first of November, and then I would bring them to the barn and shut them in and all the exercise they would get would be to get water. I would give them a good feed of shock corn in the morning and good clover hay at night and make up the amount of corn to two pounds per day and occasionally give them a feed of oats. Be punctual about your feeding and you will find they have increased 10 to 12 pounds per month. We sow a good deal of rape in the oats and we find out to make money in our feeding operations is to feed the crops we can grow on the farm before we send them to market. We clip and straighten out the tail a little and if it is possible and we have the time we trim a little to please the buyer's eye.

My experience has been that a lamb will not pay for its feed after you have been feeding it all it would eat about 12 to 14 weeks. They cannot be forced to do any good after that time and as I suppose everybody is like myself—does the feeding for the purpose of profit. I tried this season on a seven weeks ration and sent them to show and market and while I won second they were three weeks behind and not up to condition as they ought to be, and therefore I had to be contented with second place. I have discovered the ewe lambs are much better feeders than the wether lambs, they rest more contented.

I love it, I love it, and who shall stop
Your bard from enjoying his mutton chop,
O, tender morsel grateful and cheap
From the loin of a good fat juicy sheep,
To my palate 'tis bound by a thousand ties
Of pleasant and succulent memories.
Which awake at the sight of a butcher shop,
For a sacred thing is my mutton chop.

I love it, I love it, let those who please
Enjoy a diet of nuts and peas.
Let Shaw compose his dramatic scenes
On cabbage, tomatoes and kidney beans.
Let Eustace Miles find muscular force,
In carrots, cutlets with plasmon sauce,
Or other equally messy slop,
But give me my old fashioned mutton chop.

I love it, I love it, and hail with glee
The sage remarks of Sir Crichton B.
A Daniel, A Daniel, to judgment come,
To right the wrongs of the injured tum.
To give the faddists who swear by greens,
A dose of metaphorical beans.
And like a thousand of bricks to drop,
On all who'd suppress my mutton chop.

The President: Now, gentlemen, don't be afraid to ask Mr. Stone any questions.

Mr. Bayard: A gentleman in the audience requests me to ask you the name of the medicated salt you fed your sheep.

Mr. Stone: Don't you know it? Doesn't he advertise in your paper? Well, I guess I'll have to give it to you: it's Holland's Medicated Salt, Wellington, Ohio.

Mr. Bayard: What about the old-fashioned mutton chop, I can't get them any more?

Mr. Stone: The reason you don't get them is because they're killed when they're lambs. Last year I sold the highest priced lambs that were ever sold in the United States, and I am proud to say that Pittsburg got them, and they've been selling them ever since, too. I got 11¼c a pound for them.

The President: What proportion of the exhibition sheep fail to be breeders?

Mr. Stone: Oh, I'm going to answer it, but I don't want to give myself away too bad. I want to say for myself that I have been very successful, and I think only about two per cent of the sheep I fitted for show were not breeders, and the reason they are breeders is because I do not fit them more than one year. It is very expensive to fit sheep for show. I believe that most people who fit sheep for show lose five dollars for every dollar they get out of the fair association. I said in my little article that we run the risk of losing the cream of our flock, because they are the only ones that will win. I am very careful and I keep my ewes from getting too fat, and I think I do not lose over two per cent of the sheep I fit, but there are a great many breeders who do not understand how to do these things, and they lose a large percentage of the sheep they fit. Our President here never sacrificed very many of his exhibition animals; he always sold them out at high prices before he got back here, and he really came back with money. After he was out there a few years we got the credit, but he had the combination.

Dr. Gay: Mr. Stone has been silent on the subject of breeds. I think the most important question is, what is the best breed and why? I know what the book says, but I would like to have Mr. Stone tell us why he prefers to breed the Oxford Down.

Mr. Stone: The reason I breed him is because I believe him to be the best on earth.

Dr. Gay: Why?

Mr. Stone: Because I get more pounds of wool from him than from any other. In this country, possibly, it is all right to breed the Merino. He lives on moss, but it seems to me that in some places he would have to wear off his nose looking even for it. Next to that I would have the Southdown. Because I have the Oxford is no reason why they are the best everywhere else. I would take the little Southdown. You don't have to pay tax in Pennsylvania, so you can breed what you please. The Shrop is not like the other sheep; most of them are good for one thing or another, either as wool-bearers or breeders, but the Shrop people have been breeding for their fancy points until they have about dropped out of the list. I think that perhaps we might get a good Oxford ram to temper them, and that way make something of them. Some of the other breeds like the Cotswolds and the Lincolns were all right when we lived in our little old log cabins, but that day has passed away, and the selected stock has come into use, and I don't see what is the use of these other breeds any more. There is very little meat on them, or wool, either. Now, if I had a mountain cabin I would have a small sheep. Our Oxford is too big, and has his feet too far apart to climb these mountains.

Mr. Bayard: How about the Dorset? You don't say anything about that.

Mr. Stone: Well, I want to tell you about that—Joe, will you say anything?

Mr. Henderson: Go ahead.

Mr. Stone: The Dorset is a very beautiful sheep, but you don't get very much wool from it, although you can raise a very nice little lamb. They are a very nice sheep to keep for a hot-house lamb. You can have lamb any time you want. The man who breeds hot-house lambs should have the Dorset. If I had them, I would ship the lambs to market as soon as they are weaned. Our breeders in England have the mothers shipped with them to London, and then have the mothers sent back. It is like Hackney horses that they drive around the square, just for show. The Dorset is all right, but I think the New York people can beat you raising him.

Mr. Bayard: What about the Tunis?

Mr. Stone: The Tunis is a very handsome sheep; he is ring-streaked with stripes. I think he was the progenitor of all others. We use the Oxford on the Tunis, and we find them red when they first come, but afterwards they are all colors. I have never fitted them.

Mr. Bayard: Mr. Palmer ought to stand up here. He uses Tunis.

Mr. Palmer: I don't see why I shouldn't. I'll stand by those colors.

Mr. Lantz: I would like to ask Mr. Stone why so many of the Oxford breeders are beginning to breed them like the Shrop. Why are they beginning to cover the head to make it appear like the Shrop? Another question: Can the Oxford lambs when six or eight weeks old be weaned from their mothers and raised on cracked corn fed them early in the morning and fattened for market?

Mr. Stone: I will answer the last question by saying I don't know. We have never tried it. I have never raised them for that purpose, and I can't tell. The other question I will answer by saying that there are fools in this business, as in any other. They are trying to breed for the fancy points that they think the people want. That is the trouble with the Shrop. I find that a great many breeders in England are trying to cover the face of the Oxford like the Shrop, and I think they are making a mistake.

Mr. Van Norman: How about the Cheviot?

Mr. Stone: It's a beautiful sheep, and I think will do better in Pennsylvania than almost any other breed. They are a mountainous animal, and will do well anywhere in the mountains, but if you have any niggers, you don't want to set them to catch the sheep; they never can catch them. But they are a beautiful sheep. They are like the Welsh Mountain sheep, and can live on almost anything, but after hearing the Professor tell how many tons he got from five acres, I can believe almost anything.

Dr. Gay: I simply want to say that we must get Mr. Stone to Philadelphia. He has never been East of Pittsburg, so he imagines that Pennsylvania is all mountains, but if we get him East to Philadelphia, we can show him Chester and Lancaster counties, and he will see some of the finest farming country in the world. The West has not got all of it, as he will learn.

But I want to say that he has brought out the point I wanted. As a matter of fact, I have been talking to my classes about sheep breeding in Pennsylvania, and of the various breeds adapted to these localities, but I have never been able to make absolutely sure of my ground, and I wanted to see what the breeders had to say in regard to it. It seems to me that Mr. Stone has answered my questions very well. I don't like to hear him talk about our mountains, though, with the inference that we have all scenery and no farming land. We have one county in this state that excels many states in the Union, and can compare favorably with the best of them, not even excepting Illinois.

Mr. Stone: I have passed through this state in going to New York, and when I stopped at Philadelphia, I began to think I was mixed up with Boston, for I began to think Philadelphia had the beans.

Now, I have seen that fine farming country of yours, and I would like to sell you a few Oxfords just to show you how good they will do. They will thrive on the lowlands, but on the hills they won't do well. The Shropshire is the same. In fact, none of the heavy breeds wants to climb the mountains. It takes a light sheep to do that.

Mr. Lantz: I don't want to interrupt you, Mr. Stone, but I would just like to emphasize the point which Dr. Gay brought out. Now, if the Oxford came to Chester and Lancaster, we would get a good combination with the Shrops, they would come into competition.

Mr. Stone: They'll hold their own, never you fear.

Mr. Lantz: I have had fifteen years' experience breeding Shropshires on the Eastern slope of the Alleghany mountains, about fifteen hundred feet above sea level. After that I had six years' experience breeding them in Chester county, about four hundred and eighty feet above sea level, and I find that the Shrops have done a great deal better in the low lands than in the high region. Therefore I think that the Eastern section is more adapted to the heavier breed of sheep. The idea of having high-lying, hard land for sheep is wrong. I am glad to see Dr. Gay advocating sheep-breeding for Eastern Pennsylvania. There is really no better sheep raising country anywhere than that of Eastern Pennsylvania, lying four to five hundred feet above sea level.

Mr. Stone: I don't recommend any man who has the Shrop to charge to the Oxford. You have to follow your own fancy more or less in the breeding of sheep. I have brought all the breeds across the sea, and I have tried them all, and each one has his own peculiar points of excellence. If I had a flock of Shropshires I would not exchange them for anything else in the world. My wife says—and she is a Pennsylvania Dutch woman, and she ought to know—that I am the most obstinate man she knows; that I always will have my own way. I have seen changes made all over the world, and they are all for the better, except possibly in the case of the Shrop when they breed him for fancy points, and they will continue to improve and become better as time goes on, with the exception of possibly the Southdown and the Oxford; they won't get any better because they are already as good as they can be. But when they breed the Shrop for fancy points, I think they are making a mistake, and unless this breeding for the woolly ear and covered face is stopped, I know that the next two or three years will see a class of Shrops with a big upstanding ear. Now, their ears are so small that you can't see them at all, and we'll have to go back.

Mr. Wagner: Where do you consider the difference lies between the Oxford and the Shrop?

Mr. Stone: Well, I'll tell you—you take a little—well, I see you have asked that question about different points.

Mr. Bayard: This is where you shine, you know.

Mr. Stone: Oh, I'm going to shine, all right, and I'll try to answer that question, too, but I don't want to hurt the feelings of the Shropshire men.

Now, a year or two ago, a few of us got together in Chicago, and we talked of the different varieties to make the most money. I contended that the Oxford was the best for taking out on the plains, and I offered them to send ten rams to the West, and let the others do the same, and then let the lambs come back to Chicago. Well, Nolan took me up, and he took the three varieties, the Oxford, and the Southdown and the Shropshire. A year ago last August he shipped them back to Chicago, and they carried out my idea exactly. Those Oxford lambs brought 60 cents per head more than the other varieties. That satisfied me, if I had not been satisfied before, that they were the best sheep, and the best shearers, and the best money-makers.

Now, when it comes to winter lambs, I would not have the Oxford, because they will not mature like the lighter breeds will. On the farm, you know, we want those that will weigh 425 pounds before they are two years old. The highest I ever had weighed 450 pounds, but many times I have had yearling ewes that will weigh 300 pounds, and I get from three to five pounds more wool than the Shrop gives. That is the difference. They sell at the same price on the market, but the Shrop will fail you when it comes to the wool. We take these lambs and feed them up after we have sheared them, and then the Pittsburg people give us 11¼c a pound for them.

Dr. Hunt: What were they crossed with?

Mr. Stone: With Merino ewes.

A Member: Do the markets of this country really want 400 pound sheep?

Mr. Stone: No, sir; and not very many of them go to market.

A Member: What is the average weight of your fleece?

Mr. Stone: Well, I have been looking over my account book for the last thirty years, and taking into consideration that I have a great many old ewes on the farm, I find that I have never been below eleven pounds on the whole flock, and never reached thirteen, so it is about twelve pounds on the average.

A Member: What would you do with the dog? You see we have a great many dogs in Pennsylvania; perhaps that accounts for the fact that we do not have more sheep.

Mr. Stone: Well, I'll tell you what I do about dogs. No man in the world loves a dog better than I do, but I love him dead. I am very kind to them. I never shoot them, but you know a dog is very fond of beef, so I put a little strychnine on the beef and put it away in my pocket, and when I see a dog I don't like, why, I just feed him. Sometimes there is quite a corner in dead dogs in my country. I had a flock of $1,700 worth of sheep destroyed in one night by the dogs, and I swore vengeance on the dog.

Dr. Gay: I don't want to take up too much time, but I am interested in sheep, and I have a very high regard for the opinion of Mr. Stone. I wish he would tell us something about the different varieties of sheep, particularly the Oxford and the Shropshire.

Mr. Stone: I brought some of the Shrops west with me, and, of course, I have a high regard for them, but I prefer the Oxford. He is a better wool-bearer. Of course the Oxford is a recent breed, but if the Shropshire people get the idea into their heads that the Shrop is a much older breed, they are mistaken. There is not two years difference in their introduction, and their presentation to the Royal Shows of England.

Dr. Gay: That is the impression they gave us, that these sheep were introduced quite recently, to meet the market demands.

Mr. Stone: Certainly, sir; if you look at it from an Oxford point of view, you will find that what I tell you is so. You will also find this: that in Germany the people will not buy any breed of sheep except the Oxford crossed with the Merion, and they cross with the Merino better than any sheep on earth.

A Member: Will Mr. Stone please tell us the age of the lambs for which he got 11¼c?

Mr. Stone: They were lambed in March and shipped in November. They weighed a hundred and ten pounds, and never had any corn until after August.

I want to say that I had a very hard time coming down over these mountains, but I will have a very good report to take home to my wife of this meeting and the people here.

The President: We will now be addressed by Dr. Pearson on "The Pennsylvania Meat Inspection Law." I now have the pleasure of introducing Dr. Pearson.

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## THE PENNSYLVANIA MEAT INSPECTION LAW

### By Dr. Leonard Pearson

The last time I had the pleasure of meeting Mr. Stone was at George Adams' at Farringdon, in Berkshire, England. He was over there buying rams. He got the best the breeders in England had, and after watching him make that trade, if I had not known he was an Englishman, I might have thought he was a Hebrew.

Mr. Stone: America demanded of me to do my part.

Dr. Pearson: You did it, I can say, and you took away that year some of the best the breeders of England had.

I can't let this opportunity go by without saying something about the general status of the agriculture of Pennsylvania. Some remarks made by Mr. Stone would indicate that he thinks our land is all stone, but as a matter of fact, we have some of the best agricultural land in the United States. Now, when Mr. Stone crossed the state, he did so on the Pennsylvania railroad, which shows beautiful scenery, but it does not show all of the good agricultural land of the state. It is not until you are east of Harrisburg on that line or until you cross the state from the north to the south, that you realize our farming possibilities. As Dr. Gay has said, the agricultural products of Lancaster county alone are nearly as large as those of some states; they amount to ten million dollars a year. There are only thirty-four counties in the entire United States that produce more than five million dollars worth of farm products a year, and out of these thirty-four six are in Pennsylvania.

Just a word in regard to an important topic that has been referred to here, to dogs. I have been brought in contact with the dog question in a very direct way in connection with outbreaks of rabies. There has been a good deal of this disease in Pennsylvania. In many cases it has become necessary to quarantine the dogs in a district, and it is only where such a quarantine is established, that you find out how many dogs are practically ownerless, dogs that no one cares for and that are essentially wild animals. The Legislature has made an appropriation of $50,000 to cover bounties paid on wild animals. It seems to me that it would be more useful to the state to pay bounties on wild dogs than on wild cats, weasels and minks. Perhaps wild dogs could be included under the operation of that law.

A dog law was enacted by the last Legislature which provides that the commissioners of each county shall provide metal tags, to be given to the owners of dogs when the tax is paid. This tag is to be attached to the dog's collar. The amount of the tax is not established by the state, but is determined by each county. Every dog not wearing such a tag may be shot by a constable, after due notice and after a certain length of time. But, unfortunately, this law is a dead letter in many counties of this state. In fact, I do not know of one county in which it is carried out fully. In some counties the commissioners have deliberately agreed to disregard the law, and have refused to buy the tags.

Mr. Wagner: Can they compel the constable to go around and lock up the dogs?

Dr. Pearson: I don't think they can without the initiative having been taken by the commissioners.

Mr. Wagner: In our county they furnish the tags, but possibly not one-third of the dogs are tagged.

Dr. Pearson: If the commissioners furnish the tags, then it is up to the tax collectors and the constable to enforce the law.

Mr. Wagner: But the question is, how to compel them to do so.

Dr. Pearson: One should get an order from the Court.

I am to speak to you this morning on the subject of "The Pennsylvania Meat Hygiene Service." A State meat hygiene service is new in this state, and, indeed, in the United States. Pennsylvania is the first state to do anything important with regard to meat inspection, but now it seems to be probable that the meat inspection movement will spread over the entire country, very much as the pure food movement has.

While the meat hygiene law is new, the idea of meat inspection is by no means new. The Jews had a meat inspection law laid down by Moses, and it is most interesting to study these regulations, and how they have continued to enforce them, and how the Jews have profited by them. It is well known that the Jews have lived under very adverse conditions. They have been forced into ghettos; they have been poor, and have lived in crowded tenement houses and have lived as cheaply as possible, and yet, they are today one of the healthiest races. In the crowded tenements of Philadelphia and New York, and other large cities, tuberculosis has a strong foothold, and it carries off a very large proportion of the unfortunate of the poorer classes; yet the proportion of Jews who die of tuberculosis, living in the same conditions as these other people live, is less than one-third—usually about one-fourth of the average percentage. Although the Jews are a small people physically, they are well developed, and when they are well fed, they are strong and hearty. It is well known that the Jews of Russia and Poland have developed in this country a people very much in advance, physically, of their ancestors; and it is believed by these people that the care of the Jews regarding their food, especially their meat supply, is largely responsible for the health and longevity of the race. Of course, too much stress must not be placed on this, but no doubt, it is one of the important influences.

In this country, it was not until relatively recent times that anything was done regarding meat inspection by the U. S. Government, and it is a well known fact that it was in connection with questions as to meat prepared for export that the Department of Agriculture was obliged to first take part in this work. The action of other countries in regard to the meat coming from this country, was largely responsible for such action. Meat for export purposes had to be inspected, and gradually the idea obtained that it was not a proper thing, either hygienically or ethically, to inspect the meat shipped to other countries, and allow our own people of the United States to use the meat that they rejected. So, by a process of development, considerably accelerated of late, the meat inspection law now covers all the details of the operation of certain packing houses. Under the new law, all slaughter houses, packing houses and meat canneries that are engaged in interstate or export business, are subject to federal inspection. This means that packing houses cannot sell their products in a state other than that in which they are located without the stamp of approval of the United States Government. But, so far as an individual state, for example, the state of Pennsylvania, was concerned, any meat prepared in an establishment engaged in trade wholly within this state, whose products are sold only in the state, could not be inspected by a United States inspector, and so the consumer had no assurance that the animals killed were sound and free from disease and that the meat was properly handled. And in this state we get a large part of our meat supply from such local establishments. I don't know how many local slaughter houses there are in the state, but there are one hundred and seventy in Philadelphia and a hundred or more in Pittsburg, and scattered all over Pennsylvania, in the smaller towns and rural districts, there are small slaughter houses engaged in local business. Until the new State Meat Inspection Law was passed, these houses were under no supervision whatever.

Now, it is important from two standpoints that these houses and their products should be supervised, first, from the standpoint of public health, and second, in the interests of the meat producers of Pennsylvania. If pure food laws and hygienic conditions are of any importance at all, they are of the very highest importance with respect to our meat and milk supply, so that from the standpoint of public health, it is urgently necessary that these local slaughter houses shall, so far as possible, be placed under the same kind of supervision as the packing houses engaged in interstate and in export trade. Then, on the other hand, it is important because the people are rapidly learning the significance and the advantage of the mark of the federal meat inspector, and are beginning to refuse to buy meat from establishments without competent inspection. Now, as that sentiment grows, it is at the expense of the local slaughterer, and unless his establishment has reliable inspection, he is at a disadvantage, and this disadvantage will grow until at last he will find himself able only to sell to the least desirable trade in his community.

The State Meat Hygiene Law is Act No. 187, approved by the Governor, May 25th of last year (1907). It provides for the appointment of ten agents, under the supervision of the State Live Stock Sanitary Board. These agents go from place to place as they are assigned, for the purpose of examining slaughter houses and butcher shops in any part of the state. Now, of course, it is not possible for ten men to cover frequently and systematically each locality of the state; the area is too large; but still they are a very effective aid toward bettering conditions in the local slaughter houses of the state and have accomplished a surprising amount of good.

I don't think it is necessary to describe to you the conditions in some of the local slaughter houses. You have no doubt seen some of them and may have been disgusted by what you have seen, and no benefit is to be derived from repeating that feeling of disgust. Some of them, as you know, have been conducted in the most disreputable way, and these disreputable establishments have been competing with the slaughterers who have been trying to furnish pure meat to their customers. If, for instance, there is in a locality a certain slaughter house which slaughters diseased animals, and sells them at the lowest possible price, of course, such a man will be able to undersell the man who slaughters healthy animals and keeps his place in first class condition. It is partly for the purpose of protecting the reputable slaughterers that the meat hygiene service is being conducted.

It is important for the meat producers of Pennsylvania that this shall be done. The farmers of Pennsylvania have a large supply of meat-producing animals, but this supply should be larger. It is essential for the producer in Pennsylvania and for the growth of meat production that there be a good home market for these animals. We cannot have a good local market for them unless they are strong, reputable business men engaged in the local slaughtering trade.

And a fair amount of competition is necessary so that the producer can get a good price for his product. In other words, the local market for meat producing animals is bound to decline if the local slaughtering business declines. Hence, it is not alone to protect the slaughterer, but to protect the farmers of the State, that this meat hygiene service is being conducted.

Just what, or how marked, the effect will be, cannot yet be said. The law has been in operation only a short time. There already is a spirit of encouragement among the better and more progressive element of the trade as a result of the work that has been directed against unclean and disreputable establishments. Many of the better local slaughter houses are enlarging, improving and are preparing to do more business. All of the results so far are in the interest of the public health and the local meat-producer—the interests we wish to conserve and advance.

The President: Are there any questions you would like to ask? I know that Dr. Pearson will be glad to answer them.

I think there are a good many in the house today who are not members of the Association. Mr. Lantz, the treasurer is here, and Mr. Bayard the secretary, are here or Mr. Palmer—any of them will be glad to take your money.

Mr. Bayard will now announce the prize corn.

### Prize Yellow Dent.

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|---|---|---|
| 1. | Burton Bayard, Waynesburg, ... | No. 57 |
| 2. | George W. Gordon, Waynesburg, | No. 59 |
| 3. | J. B. Henderson, Burgettstown, | No. 77 |
| 4. | Lyle S. Walker, Hanlin Sta........ | No. 53 |
| 5. | J. G. & J. A. McSparran, Furniss, | No. 44 |
| 6. | James M. Paxton, Houston, .... | No. 75 |
| 7. | G. A. Trimmer, Mechanicsburg, | No. 12 |
| 8. | W. F. Wagner, Harrison City,.. | No. 72 |
| 9. | John S. Weaver, Kinzers........... | No. 20 |
| 10. | Henry Mesta, Finleyville,......... | No. 60 |
| 11. | C. L. Taggart, Washington,..... | No. 63 |
| 12. | Sam'l H. Broomall, Cochranville, | No. 50 |

### Prize White Cap.

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|---|---|---|
| 1. | J. P. Dentler, Turbotville,......... | No. 52 |
| 2. | W. A. McCoy, Mercer,............ | No. 80 |
| 3. | J. Kid Ritenour, Uniontown,..... | No. 3 |
| 4. | Joseph C. McCann, Fredonia,..... | No. 8 |
| 5. | F. W. Levis, Wingohocking,....... | No. 16 |
| 6. | Sydney T. Isett, Spruce Creek,... | No. 48 |
| 7. | ——————— Tullytown, ....... | No. 14 |
| 8. | F. W. Levis, Wingohocking,...... | No. 17 |

### Prize White Dent.

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|---|---|---|
| 1. | Lee L. Trimmer, (11 years old) Mechanicsburg,.................... | No. 13 |
| 2. | Julius Le Moyne, Washington,.... | No. 64 |

### Sweepstakes Prize.

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|---|---|
| Burton Bayard, Waynesburg, ........ | No. 57 |

### Best Ear Prize.

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|---|---|
| Lee L. Trimmer, (11 years old) Mechanicsburg, ...................... | No. 13 |

### Largest Ear Prize.

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| F. W. Levis, Wingohocking,............ | No. 18 |

### Boys and Girls Best Ear.

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| Lee L. Trimmer (11 years old), Mechaniscburg, ...................... | No. 13 |

### Freak Ear Prize.

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| ——————— Tullytown, .......... | No. 89 |

### Flint Corn Prize.

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| John G. Ayers, Gillette, ................ | No. 49 |

Mr. Bayard: I want to say that this corn will be sold at auction this afternoon, as usual.

Does anybody want to ask Dr. Hunt any questions regarding corn?

Dr. Hunt: I would like to say just this: that for this year I think the exhibit is unusually fine. Of course, this a bad year for corn. Perhaps another year, with similar seed we might outrun it, but taking everything into consideration, I think this is a good exhibit.

The President: If any one has any resolutions to offer, please hand them in to Prof. Van Norman during the noon hour.

Any further remarks?

Mr. Clark: What hour will the election take place?

The President: At the opening of the afternoon session. We have a full program this afternoon, and I hope every one will be on hand at once. We now stand adjourned until half past one this afternoon, at which time the corn will be auctioned off.

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## THURSDAY, FEBRUARY, 6, 1:30 P. M.

Before the formal opening of the afternoon session, a photograph of the Association was taken for publication in the Sunday papers, after which the corn auction took place, Mr. Bayard acting as auctioneer. Following this, the President took the chair, and the business of the afternoon began.

The President: The meeting will please come to order. We will first take up the reports of the different committees. We will now have the report of the Auditing Committee.

Mr. Shoemaker: We have gone over the books of the Association, and find the accounts correct.

The President: You have heard the report of this Committee; what is your pleasure?

A Member: I move it be received.

This motion was regularly seconded, and carried in the usual way.

The President: The next thing on the program is the report of the Committee on Resolutions.

Prof. Van Norman thereupon reads the following resolutions, which were adopted section by section on motion of Prof. Van Norman, the last resolution by a rising vote:

**Whereas,** there are many local organizations interested in the Live Stock Industry, whose members are unable to attend the meeting of the Association, therefore,

**Be it Resolved,** that any such organization may become a member of the Pennsylvania Live Stock Breeders' Association for the calendar year on payment of one dollar, and may have listed as associate members of the Live Stock Breeders' Association, its members on payment of twenty-five cents each and such associate members should receive copies of the Annual Report and other printed matter, but shall not be entitled to vote, hold office, or be listed under "What we breed."

**Whereas,** As a great State Fair would bring to a central point the best herds and flocks of the country at large, animals of a class that are not attracted to local fairs, and

**Whereas,** such a fair is a great educational influence, not otherwise provided for, therefore be it

**Resolved,** That it is the sense of this Association in annual convention assembled, that the State of Pennsylvania should have a State Fair, to be made possible by state appropriation, and that the Commission of Managers should be composed of practical men, representative of this and similar organizations.

**Whereas,** At our last annual meeting a resolution was adopted urging the Legislature to make increased appropriations for the further building up and support of the Agricultural Department of the Pennsylvania State College and of the Veterinary Department of the University of Pennsylvania, therefore be it

**Resolved,** That we express to the Governor, and to those members of the Legislature who worked to this end, our hearty appreciation of their efforts.

**Whereas,** We, the Pennsylvania Live Stock Breeders, in annual convention assembled, learn that every speaker who has addressed this convention, has come to us without compensation for time or effort, therefore be it

**Resolved,** that we hereby express our sincere appreciation of their generosity and the intrinsic value of their instruction.

**Whereas,** Dr. Thomas Turnbull has generously contributed a silver cup to be awarded to the exhibitor showing the best ten ears of corn, be it

**Resolved,** That the thanks of this Association be and hereby are extended to Dr. Turnbull for this public-spirited and helpful donation.

**Whereas,** This Association is indebted to the Secretary of Agriculture of the Commonwealth for financial assistance in carrying on the work of the Association, therefore be it

**Resolved,** That we the members, in annual convention assembled, express to Secretary Critchfield our appreciation of this assistance.

**Whereas,** The President of this Association, Hon. W. C. Norton, has labored earnestly on every possible occasion for its interests, and especially for the State Fair project, be it

**Resolved,** That we acknowledge our indebtedness to Mr. Norton and extend to him this evidence of our appreciation of his service.

**Whereas,** Our retiring Secretary, Mr. E. S. Bayard, has worked with great earnestness and success for the upbuilding of this Association, and for the advancement of the breeding interests of Pennsylvania, be it

**Resolved,** That we hereby express our appreciation to Mr. Bayard for his work, and for the results that he has been instrumental in producing.

**Whereas,** Death has called from his labors our highly esteemed member, T. E. Orr, therefore be it

Resolved, That the Pennsylvania Live Stock Breeders' Association, in annual convention assembled, recognize the severe loss it has sustained in the death of Mr. Orr, a man whose genial disposition and grand character will long be remembered, and a man whose influence for the upbuilding of Pennsylvania Live Stock will be at work after the wounds in our hearts are healed.

The President: Next comes the report of the Committee on Nominations.

Mr. Powell reads the following nominations made by the Committee:

President, Hon. W. C. Norton, Aldenville; Vice President, Dr. Leonard Pearson, Philadelphia; Second Vice President, M. P. Shoemaker, Greensburg; Secretary, E. S. Bayard, Pittsburg; Treasurer, J. F. Lantz, Wyebrooke.

**Executive Committee:** W. G. Powell, Shadeland; M. N. Clark, Claridge; D. Norman App, Selinsgrove; Lee R. Scott, Burgettstown; George C. Watson, State College; James Blair, Hartstown.

**Legislative Committee:** Hon. W. C. Norton, Waymart; E. S. Bayard, Pittsburg; Dr. Leonard Pearson, Philadelphia; Dr. Thomas Turnbull, Allegheny; H. W. Comfort, Fallsington; R. L. Munce, Canonsburg; J. H. Reichert, Scranton; S. E. Nivin, Landenberg; Henry Palmer, Avondale.

**Transportation Committee:** T. D. Harman, Pittsburg; Dr. J. Cheston Morris, Philadelphia; W. F. Shrum, Adamsburg; James T. Fleming, Belleville; J. Grier Dain, Malvern.

**Committee on Fairs:** W. C. Black, Mercer; James Blair, Hartstown; J. L. Henderson, Washington; J. D. Detrich, Flourtown; L. D. May, Granville Centre; W. E. Perham, Niagara.

Mr. Powell: Your committee now asks that these names be placed in nomination.

Mr. Cowan: I move that we accept the report of this committee and let Prof. Van Norman cast the ballot.

This motion was duly seconded and carried.

Prof. Van Norman: I beg to call attention to the fact that Mr. Watson is no longer at State College.

Mr. Clark: We understand that he is on a vacation and will return, so we have put him on.

Prof. Van Norman: As the President is one of the officers nominated, it will be impossible for him to cast the vote. I therefore take pleasure in casting the ballot for the gentlemen placed in nomination by the committee.

Mr. Norton: I thank you heartily for this new mark of your confidence in me, and I ask your help in furthering the interests of this Association. I can do little alone, but if the men here, and the men from the East will all fall in line, we can work wonders for the Live Stock interests.

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## THE PENNSYLVANIA STALLION LAW

### By Professor Carl W. Gay

Mr. President and Gentlemen: I am very glad to have this opportunity of addressing you on a subject of much importance to a great many of us. This is your law, originating in your Association and passed very largely through the effort of its members, therefore I want to discuss it with you and know to what extent its operation, to date, meets with your approval.

By the act of the legislature which was approved by the Governor the 25th of last April the stallion owner is required to do more than to simply record his horse with the prothonotary as has been the case heretofore. Since January 1st it has been required by law that every stallion for whose service a fee is asked must be enrolled with and secure a license certificate from the State Live Stock Sanitary Board.

The experience of the past two months seems to indicate that the things required of the stallion owner before he can secure a state license are not well understood. It is not a mere matter of registration for which simple application is all that is necessary. There are certain conditions prescribed by law which must be met and failure to meet them may result in the applicant being refused a license. Furthermore these requirements being fixed by law must be strictly adhered to and there can be no exceptions made of individual cases.

The first thing necessary in making an application for state stallion license is to give a detailed description of the stallion: age. weight, height, color and markings. This is necessary for the purpose of identification and also for the reason that it is incorporated in the license certificate. Any omission will appear there. The next essential is the original pedigree registry certificate. The license certificate, which is issued indicates whether a horse is "pure bred," "grade" or "cross bred," and the wording of these certificafes is established by the law. The "pure bred" license certificate states the horse to be registered with an Association recognized by the United States Department of Agriculture, therefore the certificate of such associations is the only authority upon which a "pure bred" license can be issued; furthermore it is necessary to see the certificate itself and not a copy, in order to establish the fact that the horse for which application is made is identical with the horse whose registration is reported. It is very important to have all transfers of ownership properly shown so that the present ownership of the horse may be confirmed. Unauthoritative tabulated pedigrees and advertising matter cannot be accepted for the issuance of a "pure bred" certificate. Any certificate or statement of pedigree must be properly authorized by officers of the Association which issued it and this must be an association which itself is authorized by the United States Department of Agriculture. The term "grade" as used in connection with these license certificates has a very broad meaning and includes all animals not fulfilling the requirements just set forth as necessary for a "pure bred" certificate, with the exception of a small group whose sires and dams are both pure bred and properly registered but in associations of different breeds; to these are issued the third form of certificate designating them "cross bred." Unfortunately there can be no discrimination so far as the wording of the "grade" certificates is concerned, between that issued to the horse whose eligibility to registration is denied only on account of an untraced third or fourth dam and the horse of the most mixed or nonedescript breeding. The clause "not of pure breeding" which appears in the grade certificate should therefore be interpreted "not registered."

The third requirement is a fee of $2.00 which is necessary in all cases whether an animal be pure bred or not. This money is immediately turned over to the State Treasurer and no license can be issued until there has been a $2.00 remittance to cover it. Finally some certificate of soundness is demanded and this may be the sworn certificate of a qualified veterinarian licensed to practice in the Commonwealth of Pennsylvania or the owner himself may make affidavit that after diligent inquiry he believes his horse free from hereditary, contagious and transmissible unsoundness and disease. Unsoundness or disease of an hereditary nature will disqualify a horse for breeding purposes.

If you, the stallion owners, have fulfilled your part to the letter there will be issued to you a state license certificate certifying to the description, breeding and soundness of your horse and authorizing him to be used for public service in the Commonwealth of Pennsylvania.

The conditions that brought this law into effect:

It is a well known fact that Pennsylvania consumes as many horses as any other one state with perhaps one exception while in the matter of production she stands away down on the list. Inquiry into the matter leads me to believe that the production of horses is less than it was ten or fifteen years ago with no improvement whatever in the class of horses. I have been told by some of the largest dealers in the state that it is impossible to secure anything like an adequate supply of horses of the quality, type and breeding which they require without going to distant states, although they would prefer to patronize the home breeders and are interested in improving the class and number of horses produced in this state. There can be no question that an increased activity in the horse breeding industry in this state would not only improve the number and sort of horses here, but would be found a source of profit to those engaged in it. I know that there will be exception to this statement made on account of the fact that we cannot compete with the western farmer, who can undersell us and thus get our trade. So far as economy in production is concerned, together with the selling price on the farm, this is undoubtedly true, but in view of the fact that the majority of the highest class horses come east and that eastern buyers in the west always allow a liberal margin to cover the cost of getting these horses on eastern markets, our closer proximity to these markets will be found to offset to a considerable extent the advantage enjoyed by the western farmer in first cost of production. At any rate the question is not so much "Can we compete with the western horse raiser" as it is "Can we not find it to our advantage to raise more and better horses."

Three things may be charged as responsible for the lack of progress made in the horse breeding industry in Pennsylvania in recent years. The first is the evident lack of a clear conception of what constitutes a good salable market horse. The second is an absence of good blood which may be expected to bring about improvement or the indiscriminate use of what little good blood is already available, while the last and perhaps the most serious condition responsible for the present state of affairs is the persistence of the breeder to patronize the cheap, inferior sire and his failure to manifest any disposition to patronize well bred horses of desirable type at the higher fee which their greater cost makes necessary.

Much may be done in correcting ideals and spreading general information concerning the market types of horses, by the county fair associations. I would emphasize the importance of show ring awards as educational features. Successful competition in the show ring would not be regarded as simply a means of distributing ribbons and cash prizes but as setting forth the most desirable types for the benefit and edification of the breeding community. A comprehensive classification of entries followed by consistent and accurate awards based on that classification, will do much to raise the standard of the live stock produced in the community. Not until we have higher ideals and a more liberal view of the breeding business is taken can we expect many horses of approved type and breeding, to be offered to our breeders. Some men have objected to superior stallions being brought to this state until we have on our farms a class of mares better adapted to give most satisfactory results in mating with these horses. However much we appreciate the importance of the dam in determining improvement we must admit that improvement in a far greater number of individuals will follow the use of a superior sire than when the dams only are of improved character. Grading up is the best means of improving our farm mares and the most important factor in the grading up process is the pure bred stallion of superior type, conformation and breeding. It is for this reason that the first step to encourage horse breeding in Pennsylvania has been directed to the stallion, by regulating the services to be offered to the breeding public.

We have just reason to feel proud of the achievement of our American breeders but we must admit that most systematic improvement in the production of horses is to be noted in Great Britain, France, Germany and Belgium. In all of these countries the work is more or less under Government control and patronage and the methods involved pertain, first of all, to the regulation of stallion service. This system is most complete and effective in France where all horse breeding is under direction of the Director General and all horses whose services are offered to the public have passed a system of government inspection. They are first certified free from roaring and periodic ophthalmia or moon blindness, which are the two conditions constituting hereditary unsoundness in France. After being certified sound by the veterinarian, the branded star on the neck being the stamp of such certification, they are turned over to the inspectors who classify them according to merit. First of all it should be remembered that a large number of the stallions used for breeding purposes in France are in Government studs. Of those owned by private individuals three classes are made by the Government officials. The first class is designated "approved," and represents those of most superior type and breeding, the patronage of which is especially commended, in fact, the owners of these stallions are paid an annual subsidy by the government making it possible for them to stand at such a fee as to place their services within the reach of most breeders. The second class consists of those stallions which are not quite up to the standard of "approved," but which are nevertheless useful breeding horses. These receive no subsidies but have the authority of the government to stand for public service and therefore are termed "authorized." In the third class are those horses of no especial merit but which are allowed to remain in the breeding ranks on account of the fact that they have been certified to be sound. This class is therefore designated "certified." Any stallion which is neither owned by the Government nor inspected by Government officials and classified in one of these groups standing for public service in France does so surreptitiously.

Following the precedent of France some of the Canadian Provinces and Wisconsin, Minnesota, Utah and Iowa of the states have taken up the matter of improvement in horse breeding and have passed laws regulating the service of stallions. The passage of similar laws is at this time being contemplated in the state of New Jersey, Ohio, Kansas and Indiana, the indications being that there will eventually be uniform laws in the majority of the states controlling this phase of horse breeding.

There seems to be very little question of the benefits to be derived from the operation of a law of this sort, although I am aware that some criticism is made of the means taken to attain the desired end. It should be borne in mind by those disposed to doubt the wisdom of the parties responsible for the form of the present Pennsylvania law that at best a radical measure and sudden enactment will bring to an abrupt ending the practices of certain men who have suffered no interference whatever for years and even generations. The enforcement of laws is usually intended to drive rather than lead, yet there is much of an educational nature about the successful administration of the law in question. It was necessary that the act be originally framed in such a way as to make its immediate operation possible with beneficial results, at the same time avoiding such opposition as might, in the first place, prevent its ever becoming a law or make impossible its administration in case it passed the legislature. The two points most commonly assailed are those pertaining to the licensing of other than pure bred stallions and the issuing of licenses on the basis of the owner's affidavit of soundness. In defence of the first it may be said that it would be practically impossible to retire from the service at this time all but pure bred stallions in the state of Pennsylvania. While the grade sire as a rule is an uncertain proposition, his patronage to be discouraged, there are undoubtedly many useful sires now in service for which a pure bred state license certificate could not be secured. What the law does do is to prevent misrepresentation in the matter of a horse's breeding thereby creating a sentiment in favor of the pure bred horse which may eventually result in his being the only one authorized by the State Department of Agriculture. It was necessary to accept the owner's affidavit of soundness on account of the fact that in some counties there are no qualified veterinarians and to demand a veterinarian's certificate of soundness would be to impose the next thing to an impossibility upon the owner. No doubt this privilege is sometimes taken advantage of but those cases will usually be found to work themselves out to a satisfactory adjustment. The time will probably come as it has already in Wisconsin and Minnesota when the owner's affidavit will no longer be accepted. The law as it now stands must not be regarded as final but subject to amendment from time to time. While purposely made rather open to begin with there may be a gradual tightening up as time goes on and its administration shows up certain changes which could be made to advantage. Now I have left for consideration one matter which I would like to hear discussed at this meeting. Our law makes provision for a special certificate of approval to be awarded after the French custom to horses of superior type, conformation and breeding. We have received a number of applications for these special certificates but as yet none have been awarded for the reason that a system of making these awards which of necessity must be uniform, has not been satisfactorily worked out. It is proposed to organize in the various counties or breeding districts, stallion parade associations whose main object shall be the holding of an annual exhibition of all breeding horses in that locality. This would result in all eligible horses being centralized at a given point when the award of a special certificate of approval could be conveniently made. The judges, however, who are to make these awards should adhere to a uniformly high standard of excellence in order that these certificates may have the same significance no matter where secured. The ideal system would be that which admitted of all awards being made by a commission appointed for that purpose, however, since the territory to be covered is so great and the funds available for this work so limited such a system does not seem possible at this time. In Canada where these shows have been held with marked success two judges, one a veterinarian, are appointed in each district.

The objection may be raised, that such a plan would necessitate taking the horses a long way from home thereby imposing some expense upon the owners; but this very thing would have the desirable effect in that it would result in only those horses which were very certain to receive recognition being presented for the special awards. It has worked well in other countries and as much may be expected of it here.

In conclusion, gentlemen, I would like to ask your co-operation in the administration of this state stallion law. Consider its intent rather than the present form which is subject to modification, as suggested by you, at each subsequent meeting of the legislature. The first step necessary in the enforcement of this act is to reach every stallion owner in the state with a notification of its existence and his obligations to it. In many cases it is then necessary to explain more in detail some of the provisions of the act which may not be well understood. In both of these essential steps you members of the Pennsylvania State Live Stock Breeders' Association can by your co-operation aid matrially in securing the results which it is hoped to attain and it is with that fact in view that this matter has been discussed before you today.

The President: Any questions?

A Member: If I understand the gentleman right, the owner must absolutely receive the certificate from the Association in which the horse is registered. When we purchased our horses, we were informed by the importing company that no duplicates could be procured.

Dr. Gay: Yes; we assume the responsibility for that certificate after it is sent us; if your horse is registered, send us the certificate of the Association in which it is registered, and we will assume the responsibility of getting it back to you in as good shape as when you sent it. Duplicate certificates are issued by most associations upon satisfactory proof of the loss of the original and receipt of an additional fee.

A Member: Is there a renewal every year, or does one certificate answer?

Dr. Gay: A renewal very year.

A Member: Is it necessary that the horses be examined every year?

Dr. Gay: Yes, sir; it is.

A Member: What constitutes hereditary unsoundness?

Dr. Gay: In Wisconsin they have stated in their law what constitutes hereditary unsoundness. In this state it is left to the discretion of the man who examines the horse. A horse may be subject to deformity in structure, or weakness in some vital part, or it may have simply a predisposition which will develop later. At the present time the matter of what constitutes hereditary unsoundness is left to the judgment of the veterinarian. It is a matter of discretion on his part at present, but if there is demand enough, I have no doubt that in time the law will cover that point.

A Member: In order to get a prompt return, what is necessary?

Dr. Gay: To get in the application made out in proper form and with all necessary enclosures as soon as possible.

Mr. Gowan: I want to repeat what I said at Harrisburg in reference to using a high bred mare to improve the stock. I have been breeding horses for thirty years, and I am more firmly convinced today than ever before that if you want to raise the standard of your horses, you will have to improve your mares.

Now, I should like to ask a question. The question has been agitated in our county of introducing good heavy draught stallions to use with the lighter mares to improve the stock of the country. I do not believe it will do the work. What is your opinion on that?

Dr. Gay: If the mares in your community have a preponderance of hot blood in their make-up I would not advise the use of cool blood draft horses to bring about improvement even though the mares are lacking in size and substance. Such a procedure involves a most radical cross, the results of which are extremely uncertain and unsatisfactory. A better means of securing improvement would be by the use of individuals of similar breeding but selected as possessing unusual size and substance for the breed. In France the government authorities will do nothing to encourage the breeding of light horses in the draft horse districts nor will they permit the use of cold blood in the districts which are given up to the production of light horses.

Mr. Palmer: When you get down to the second generation, you can't tell what you may get.

Dr. Gay: As soon as I become acquainted with the different districts, I will publish, within a year, a bulletin on horse breeding in the state, and then I will take up this question of breeding. I heartily agree with the gentleman, that you should not introduce new or alien blood into any well-established line of breeding that is already giving satisfactory results.

A Member: A gentleman, a few minutes ago, anticipated my question as to what constitutes soundness. Now, it seems to me that this is the weak point in the law that it does not specify this, but leaves it to the owner or the veterinarian. Of course, every man believes his horse to be the best, and it seems to me that the standard as allowed here is too uncertain. I remember very many years ago, when I used horses more than I do now, it was my business to select a good horse, and I went to a man who was a good horseman and breeder, and I asked him what next to the temper and conformation of a horse, constituted a good horse, and he said one sound in the feet and knees, because if a horse is not good on his feet, he is practically worthless. Now, there has been but little said in regard to this important discussion, but in my judgment, it is one of the most important points in a horse. Many things have been brought out here that are true—for instance, that you can only tell the value of a horse in his get. We all know that to be true. Some of the horses I have known with the highest pedigree, are practically worthless as breeders. One of the highest pedigreed horses I ever saw was owned by Barney Treacy, of Lexington, Kentucky, yet his progeny numbered less than forty. That was clearly not a horse to have for a breeder.

Dr. Gay: The gentleman is quite right in his assertion that the foot is the foundation of the horse and the only reason that it has not been mentioned in this discussion is that there has been nothing said of any specific unsoundness I am sure that those conditions to which the horse's foot is subject would receive proper consideration in determining the qualifications of a horse for breeding purposes. The form, size and texture of the foot, however, is a matter of conformation rather than soundness.

Mr. Snyder: What would you say of grease heel?

Dr. Gay: I have never seen that listed as hereditary, because it is a temporary matter.

Mr. Snyder: We have had a good many of them, and all their offspring run that way.

Dr. Gay: Yet you would hardly be justified in calling that hereditary unsoundness. That is a point, though, on which Dr. Pearson is better qualified to speak than I am.

A Member: I believe that the national government is attempting to establish a standard for unsoundness.

Dr. Gay: Only for show ring horses, so far.

A Member: But it will take the place of an established standard, will it not?

Dr. Gay: It would, although we might not be able to apply it at the present time. It is an important move, though.

Dr. Pearson: As those of you who were at Harrisburg last year will remember, this bill was copied from the Wisconsin law, and the Wisconsin law then did not cover this question of soundness, and it is largely due to this that our law does not state specifically just what comes under the head of hereditary unsoundness. The Wisconsin law has been amended since then, and it now states what they consider unsoundness. Our act provides that the horse must be declared sound by a veterinarian, or by the owner under oath. Now, a horse could have a sprain from a perfectly legitimate cause; he may incur a sprain that will produce curby hock, but if the sprain is not caused by weakness of conformation, it would not disqualify the horse for breeding purposes. Similarly with a roarer. If a horse at nine or ten years old has pneumonia and develops roaring, he could not be considered in the same class with a horse two or three years old who has never worked.

A Member: I find a great fault in allowing the owner to make out the affidavit. There is a great deal of trickery among horsemen. I am a horseman myself, and I have never known one of them to admit that there is anything the matter with his horse. His neighbor's horse may be all wrong, but his own horse is always all right, and it appears to me that the law allows for a good deal of leeway in this matter.

Dr. Gay: There certainly must be some protection in the fact that the owner is under oath, and swears that he makes this affidavit "after diligent inquiry." I myself would highly approve of having a veterinarian examine the horse in every case, but this will have to be reached gradually.

The President: I thought the same thing, last winter in the House, but it would have been impossible to pass the bill in that form. It would have been too drastic. Now, I see no reason why the bill cannot be amended when the Legislature meets again. If it is the wish of the Association that the bill be made more drastic, it can easily be made so.

Mr. McCoy: I move you, sir, that the Chair appoint a Committee to look into this matter of unsoundness, and have them report at the next winter's meeting.

This motion was duly seconded and carried in the regular way.

The President: I will announce this committee a little later. I will see to it that it is appointed in a short time, and report to the Secretary of the organization, who will notify them.

Are there any further questions to ask Dr. Pearson or Dr. Gay?

Mr. Bayard: There is some more corn back there; if any one wants to buy it, I will be glad to sell it to him.

The President: It seems to me that some one wanted to ask a question a moment ago.

A Member: The gentleman just answered my question, but if I have a horse with a sprain, which I do not consider unsound, but the veterinarian does, how are we to get at the matter?

Dr. Pearson: On that point I would say: a horse may break his leg, and have a weak leg as the result, but if he is used for breeding purposes, his colts are required to have perfect legs. In the same way, a horse may sprain his leg and produce curby hock; in that case it is not transmissible, but if he gets that way from ordinary work, it shows that he has a weak hock, and should not be used for breeding purposes. Now, take the racing horses for instance; they are generally used on the track until they are broken down, and in the course of five or six years, these horses will generally develop imperfections that are the result of accident, and yet their get is free from these imperfections, simply they are the result of accidents, and do not belong to the horse.

The President: A motion to adjourn is in order. I would like to say to these gentlemen from the western part of the state, that I hope we will all meet at Harrisburg next year. We would like to see your faces in the East.

Mr. Bayard is still in the corn business, and if any one wishes to buy any more corn, Mr. Bayard will be glad to supply him.

Mr. McCoy: I move we adjourn.

This motion was properly seconded, and carried in the regular way, and the Ninth Annual Meeting stood adjourned.

## SOME THINGS IN DAIRY FARMING

### By Hon. W. D. Hoard, Fort Atkinson, Wis., Editor of Hoard's Dairyman

What does it mean to be a dairy farmer of today? This is a very important question to everyone down the long line of men who make up this great dairy industry. There is no man in that line who is as important to the industry, as the farmer back on the farm. On him must rest nearly every important consideration; the quantity of the product, the quality of it, for here he governs completely; the stability of it for if he finds it unprofitable the whole line wavers and is thrown into confusion. It is his honor, conscience, intelligence and watchful care that determines the quality of all the products of the cow. On quality depends consumption, and on consumption depends price and profit. All this depends on the man behind the cow. Then, besides, the character of the cow herself depends on his intelligence, discernment and enterprise.

The dairy farmer is the man at the switch sending the train along the right track or stalling it on a siding.

We have only to think this business of dairying out to its roots and branches to see that all the forces of education, law and public opinion should be enlisted to make the dairy farmer understand his own importance to the whole, and fully and thoroughly understand what it means to be a dairy farmer of today.

In thousands of instances the love of money, larger profit, better reward, is not enough to make thinkers of unthinking men, who keep cows and unprofitably fill the place of a profitable dairy farmer. And so there must be constant agitation of the subject: constant stirring of thought, constant holding of conventions and institutes; constant reading and study, that if possible, these men who keep cows and do not realize what dairying means, may be reached and lifted up until they can see the question in its true light.

Think of the great width of this question. Think of the vast army of men it supports from the farm to the creamery and cheese factory; of the thousands of dealers and commission merchants; of the manufacturers of machinery and dairy supplies; of the great transportation interests on both sea and land that look to it for sustenance. Then think of the millions of consumers who wait upon the cow and all these intermediaries for their daily food. The cow makes it right, pure and good. If there is any thing wrong with it, it comes from the ignorance, indifference and willful neglect of the men who stand between the cow and the consumer. Chief among these is the farmer. He must be held to the largest responsibility for he has the most to do with the milk at the time of its greatest liability to bad impressions. At every stage beyond him modern science has done more to perfect the way than it has at the farm, and this for the reason that farmers, as a class, have not believed in science. They have not taken an educated mental interest in their business. The domain of science is in the mind and farmers have had but little mind for it. Hence, they do not see how it bears upon their work. The greatest problem in agriculture today is to get the farmer to see where science touches him and his life work and so take advantage of what she has to give.

Right here lies the larger meaning of dairy farming. I have spoken thus in a general sense so we may take a larger view for a moment of the great field dairying occupies and the necessity that exists that the dairy farmer should comprehend well his own relation to it. I have selected a few special lines to talk upon that bear most sharply upon the farmer. First of these is the breeding of the right kind of a cow for his work. Do you know that when we come to study into this question, it is absolutely appalling to see what enormous losses the farmers of the country sustain because they will persist in breeding and keeping cows unfit for dairy work.

Hoard's Dairyman has spent $3,000 in taking cow censuses in ten states, from Iowa and Minnesota all the way to New England. In several of these states such as Wisconsin, Ohio and New York, several censuses have been taken. As accurate study as possible was made of each cow, in each herd, and a statement made of what she earned at the creamery and what she cost in feed.

From this mass of testimony, the best that has ever been attempted, we find that fully one-third of the cows are kept at actual loss.

Think what a drain upon the farmer and the country this is. Is it not time that the men who keep cows tried to obtain a better understanding of what it means to be a dairy farmer?

### The Upward Step.

We are all affected by our environment. How universally true is the old saying "A man is known by the company he keeps." There is no getting away from the influence of association. Every farmer is subject to it. The books and papers he reads are his associates, just as much as the men he meets. One of the greatest dairymen Wisconsin ever produced was Hiram Smith, of Sheboygan county, who died in 1890 and for whom one of the important buildings on the University Campus, the Hiram Smith Hall, was named. One of his favorite sayings was, "A registered sire is a great educator. It is an upward step." He had seen farmers about him in all stages of development and with no development and he declared that there was no hope of a man's upward progress as a farmer just as long as he kept a grade or scrub sire. Here again do we see the effect of the law of association. We have noted it ourself in hundreds of instances. All about us in Jefferson county, Wisconsin, now noted for its production of dairy cattle, are farmers who have made handsome progress in knowledge and wealth. Their progress dates from the very hour that they commenced keeping a pure-bred sire. A large proportion of them are Germans, who have been obliged to learn to read English in a slow and difficult manner. They saw the improvement that came in their neighbor's cattle from such a sire. That set them to thinking. Buyers came and paid more for the heifers and cows from such sires. The buyers were a different order of men. They talked on an upward grade. Here was another association. One good sire at registered prices succeeded another. That was more association. Their minds began to expand; they could see more in this business of dairy farming. Their farms are selling for $100 to $150 an acre. They sell annually a half million dollars' worth of cattle. Their sons are going ahead, making more intelligent dairy farmers than did the fathers. They are attending the short course at the College of Agriculture. Several of them have branched out into breeding registered cattle. In 20 years there will be hundreds of such breeders in Jefferson county. Who can measure the influence and effect upon a farmer when he commences to associate with pure-bred cattle?

Yes, Hiram Smith was right, "A registered sire is a great educator." Verily, "A man is known by the company he keeps." Scrub cattle will hold a man down to scrub ideas on general farming. There can be no "upward step." The influence is retroactive on both the farmer and his cattle. Better ideas lie at the bottom of all betterment.

There are a hundred copies of dairy and agricultural papers read by our Jefferson county farmers today where there was one 20 years ago. The barns, the fences, the fields of alfalfa, clover and corn, all show an upward trend in thought as well as in the methods they practice. How powerful has been the reflex effect of this law of association. Let us be careful of the company we keep. "Birds of a feather flock together." When a man buys a registered sire he gives notice to the world that he is on an up grade himself in his ideas of cattle. It will not be long before he will think towards improvement in other things.

### Keep the Calves Dry and Clean.

Every human mother, that is fit to be a mother, knows that if her baby is allowed to remain wet and uncleanly, it will soon grow sickly. The bovine baby is strictly amenable to the same law. Every calf raiser must have seen the ill effects of allowing calves to lie in their own voidings and urine. A farmer was once showing us his stock. His horses were bedded down with an abunddance of straw. His calves were lying in filth and moisture that made us indignant to behold. "What are you raising those calves for?" we asked. "To make cows of them," he replied. "Oh, no, you are not. You are raising them to be weak sickly failures," was our answer. He confessed to us that he had lost a good many calves, but he never had thought that the way he kept them was the cause.

Turn a calf or a pig out in the woods and it will find for itself a bed of dry leaves in a clean place, and they will keep healthy, if they have food enough.

In my own calf stable every winter are from 25 to 30 calves. Around the outside, next to the wall, is a feeding alley. Then comes a row of stanchions, the only place on the premises where I use a stanchion. Then comes the open ample room with a dirt floor. This is covered every day, and if necessary, twice a day, either with bright dry straw or shavings. This floor is sprinkled night and morning with a good disinfectant. The calves are fed in these stanchions, with skim milk, fresh from the separator, in clean tin pails twice a day. Then they are given a feed of oats or barley meal, followed by alfalfa hay. All this consumes an hour, say. Then they are let out of the stanchions to run at will on the floor. Twice a day they are let out in the big barn yard to have a run and play. Fresh water is kept standing before them, on the floor of the stable, all the time.

Now this care takes a little time and thought. But you can never have skill and good judgment, nor the rewards of skill and judgment, unless you invest time and thought. All this care has a great effect on the future cow. I have raised but one heifer, pure bred or grade, to cowhood in 15 years, that would not produce 300 pounds of butter and over a year. It is this careful developing. care and feed, I believe, aided by good breeding, that has given me these results.

Don't you think I have made a good deal more money with my cows by this method, than I would if I had pursued the common neglectful way? Farmers have not yet begun to half think on the fine possibilities there are in the production of valuable cows. The demand for dairy products, all over the Union, is far ahead of the supply. And the cleaner, sweeter, more perfect we make that product the more does the demand increase.

Think of the demand there is, today, for good cows. A few weeks ago Mr. F. B. Fargo, of Lake Mills, Wis., placed a five-line ad. in Hoard's Dairyman, offering to furnish Holstein grade cows by the car-load. In two weeks' time he had received hundreds of letters, as far distant as Texas, Mexico, California, Oregon and the states on the Atlantic coast, the writers of which were all anxious for one or more car-loads. He was amazed at the demand. It is so in other dairy breeds. Don't you think it will pay to turn your attention to the question of producing superior cows for your own use and the market?

The present methods of handling cows, in the great milk producing centers amount to the destruction almost of all calf raising. Cows are bought, fed high for a year or so. and sold to the butcher. This makes all the better the chance for the intelligent, far sighted, dairy farmer to make a handsome profit in growing cows to supply that market.

### A Good Bull.

There is a great host of dairy farmers who cannot yet see the cash advantage of buying a pure-bred bull and paying the going price for him. The price blinds their eyes. and so they go around looking for a cheap bull, not one that can bring them something good in return. They will say, "Oh. I'm not breeding registered stock. I cannot afford to pay the regular price for a bull." That is short sighted economy as sure as they live. They are keeping down the quality of their own cows in the future and the value of the young heifers they may want to sell. An Illinois man who annually buys over a hundred thousand dollars' worth of cows and heifers in Jefferson county, Wis., said to me recently. "I buy a cow on her looks, but I never buy a heifer until I take a look at her sire. If he is a good one, I am more confident of the value of the heifer."

Now, here is a practical example drawn from my own experience: In February, 1902. the Guernsey bull, Starlight's Excelsior 7992, was born. He was bred by the late N. P. Fairbanks, of Lake Geneva, Wis. I bought him when little more than a calf, paying a price up in the hundreds for him. I was attracted to him by the rich character of his pedigree, the excellent record of the cows

back of him and his strong prepotent appearance. He will be five years old February next, and is in his prime. From that bull I have sold $810 worth of grade Guernsey heifer calves, $1,500 worth of registered heifer calves, $2,000 worth of registered bull calves, making a total of cash sales of calves, from him of $4,310. I have on hand six of his heifers in milk two years old that I can sell any day for $1,500, and 18 of his calves with nine more to come that are worth at a low estimate $2,500. This makes the total value of his stock up to date, $8,310. Cut it in two, giving one-half of the value to the cows and then the bull stands credited with $4,155. Could I afford to pay a good price for him?

When I was a boy I read in an old almanac this verse:

"A fiddler had a cow and he had nothing for
to feed her,
So he took his fiddle and played the tune
'Consider, cow! consider.'"

Allow me for a few minutes to ring the changes on the word "consider." Please consider that the grade heifer calves of this bull, such as any farmer can raise if he will but have rich blood in the bull to start with, brought me $810, double what he cost me. It is hard to make dairy farmers see that they want good well-bred stock themselves; next, that there are thousands of other farmers that want it more than they do and are willing to pay for it. Consider, that there is no one form of our live stock today that is so scarce as good cows: that in the natural evolution of public conviction, cows will be scarcer owing to weeding out of unfit cows and consequent reduction of the size of the herds; that the consumption of milk as a food is increasing to an enormous extent and as a consequence is stiffening the prices of butter and cheese. In most of the butter and cheese producing districts there is a noticeable lessening of production owing to the drainage of cows away to other sections for city milk production.

Consider, that in all these city milk producing districts there are but very few calves raised, while the cows are kept rarely more than three years.

Consider, that only one-half of all the calves are heifers and of these but a small percentage reach cowhood, that consequently the increase of cows in so great a dairy state as Wisconsin has been only 5½ per cent yearly from 1850 to 1900. Consider, that every child born is a consumer of milk but not always of meat.

Consider, the enormous increase in the population of this country, vastly ahead of the increase in the cow population. Consider, all these things as having a bearing on the future of the dairy industry and then tell me if you do not think there is a good prospect ahead for the farmer who will go into the business of producing and rearing first class dairy cows, bred from sires of undoubted dairy parentage.

I have a neighbor, a bright keen German dairy farmer. He buys, every four or five years, the best registered Guernsey bull calf he can find to replace his old bull in a year or so. He pays handsome prices for his bulls and he will not buy a cheap animal. Mind you his herd is nearly all grade cows. He is a fine calf raiser and sells annually from 8 to 10 prime young heifers and yearlings for from $25 to $40 each, and he has quick sale for all he can produce. He will tell you every time that the great factor of success with him is the high quality of the bull he keeps. Don't you think his advanced ideas pay him better than as though they were of the ordinary unthrifty unprogressive order? He lives on a rented farm of 171 acres and he gives cash receipts of the farm in butter, cream, hogs, poultry, young cattle, etc., to the amount of $4,000 annually and he has half of it. Don't you think it pays him to practice advanced ideas of farming?

### The Matter of Breed.

It is a common thing to hear men say: "Pay no attention to the matter of breed in cows. What you want is a cow that will do business at the pail." That sort of talk is very superficial. The question of breed is a very important one. The farmers of Minnesota followed Prof. Shaw for years and as he told them, selected beef bred bulls to breed "dual purpose" cows for dairy work.

They found at last, to their sorrow, that they were getting the losing end of the bargain. Their cows were failures as dairy animals. Hoard's Dairyman warned them against the practice and anybody who had an understanding of the effects of breed on feed, could have told them the same. For years the farmers of Iowa have been advised the same thing. All the forces of agricultural education were put in requisition to hold them to the "dual purpose" idea. But the cows resulting from such breeding are not, as a rule, economic dairy animals.

The Iowa farmers, those of them who are looking into the thing, are finding that with such cows, they are losing more at the pail than they are making in beef. And so they are getting around. Hoard's Dairyman has for years preached this doctrine: If you want milk you must breed for it, and breed for it specifically.

Mistakes in breeding are a long time in making themselves felt. Hence the importtance to every farmer that he should have correct ideas as to the principles of breeding. No wonder that he is confused when well-known teachers and breeders juggle with these principles. It is as though one said, "Twice two is either three or five just as you want it." Yes, there is a great deal in breed. We once heard a story of a "dual purpose" man who went to hire out as a teacher of a country district school. The clerk asked him a few questions among which was this: "Is the earth round or flat?" "Well," said the man, "teach 'em both ways, just as they want."

A great many farmers have wanted "dual purpose" cows if they could get them. They called for that kind of teaching and they got it. But it was wrong, and they are finding it out in the last analysis of real practical results, at the pail. The farmers who stand by the dairy bred cow are winning by it. Yes, there is a good deal in breed.

I spoke of the effect of breed on feed. Here is a great mystery that no man has solved. Here stands a bale of hay. On one side is a cow; on the other is a sheep. on the other a horse. In one case the result is milk, in the other wool, in the other speed or draft, and the same mystery appears in the family of animals. Twelve quarts of oats fed to J. I. C. resulted in a mile in 2:10. That was the speed product of 12 quarts of oats. provided they were fed to J. I. C. Two cows stand side by side in my barn. They are of the same breed, and both are fed the same ration. One cow takes that food and turns out two pounds of butter fat a day, the other one pound. What is that secret through which comes such a wide disparity of results? So far as we can see, it is individuality.

Now men have seized upon these individual traits in animals. They are functional in character. By steadfast, patient work, mating agreeing individualities or functions together, after a long time they have established these traits as breed characteristics and we have the speed or draft function in horses, the milk and butter trait, or the meat producing trait in cattle, the fine wool or mutton function in sheep, and so on. A great variety of ruling traits have been established. But it is very slow work. Nature yields but reluctantly to any and all modifications of structure and specific purpose.

The modern dairy cow, as has been well said, is an artificial product. She is greatly needed in the sharp, close economy of our farming work because of the greatly increasing demand for her product. This modern dairy cow is not a rustler. She must be given the care, surroundings or environment, and feed suitable to her artificial nature, if you expect the results she is capable of giving.

Then comes this everlasting proposition of farm economics, reducing the cost of production. When I turn to those two cows, one giving me twice the product for the same cost of food that the other does, I naturally enquire how this comes. Now when I find that the first cow comes down from a better line of producing ancestors than the other, it is apt to impress me with the idea that there is something in breeding, not everything, but something.

Now, all there is to this question of breeding for specific qualities or traits, is the attempt to establish as a breed characteristic, that which originally existed as an individual characteristic. So after a long time, we have the Holstein cow with her peculiar traits, bred into her for a thousand years; the Ayrshire with hers, the Jersey and the Guernsey with theirs. If you study her you will find that Nature does her best work in straight lines, and in obedience to single purposes. If you attempt to make her construct a combined speed and draft horse, or a combined milk and beef cow, she tells you at once that the structural type or form of each is different, owing to the demand of differing functions, the same as the difference in form of the sewing machine and the mowing machine.

She tells you also that established prepotencies of heredity, one opposing the other, cannot be mated and combined to the establishment of a third prepotency partaking of the nature of both.

She tells you further, that such a forced combination results in a conflict of prepotencies and no wise breeder will set Nature to fighting herself. Our "dual purpose" friends have made one serious mistake. They have based their theory too much on the sporadic or occasional appearance of some most excellent cow here and there in their ranks. They have gone on building the beefiest bulls they could produce, paying no attention to the laws of dairy form and function, and expecting profitable milk results from such a contradictory combination.

I have asked for years this question: Where are the Shorthorn bulls, for instance, that show in their form and outline, a milk heredity, or that can be depended on to breed with any profitable certainty for milk production? This ignoring almost altogether the male line of descent, all the time breeding from the beefiest of beef heredity, and then talking about "a milking strain" is unscientific, impracticable, and as the old Yankee said, "insensible."

# WHAT WE BREED

## PURE BRED STOCK BRED BY MEMBERS OF THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

### HORSES.

#### ARABS.

Name. Postoffice. County.
Herman Hoopes..........Westchester, Chester

#### MORGANS.

Geo. A. Hogg......24th & R. R. Sts., Pittsburg
M. B. Stephens..............Dilltown, Indiana

#### CLEVELAND BAY.

Powell Bros.............Shadeland, Crawford

#### FRENCH COACH.

Powell Bros.............Shadeland, Crawford

#### CLYDESDALE.

Powell Bros.............Shadeland, Crawford

#### FRENCH DRAFT.

Powell Bros.............Shadeland, Crawford

#### SUFFOLK PUNCH.

Powell Bros.............Shadeland, Crawford

#### BELGIAN.

Powell Bros.............Shadeland, Crawford
Lyman Hunter..........Hartstown, Crawford

#### STANDARD-BRED.

Peter B. Cowan.................Brookville, Jeff.
Benj. McKeehan......Mt. Rock, Cumberland
W. C. Norton................Waymart, Wayne
Homer Bros.................Greenville, Mercer
Jas. Blair (Carriage type).Hartstown, Crawf'd
Henry Palmer................Avondale, Chester
Powell Bros.............Shadeland, Crawford
W. E. Stevenson..Burgettstown, Washington
J. M. Main & Sons.Shippensburg, Cumberl'd
D. H. Waite....Warrior's Mark, Huntingdon
W. H. Ridge....................Trevose, Bucks

#### SHIRE.

Sam'l McCreary..............Volant, Lawrence
Wm. L. Christley......Slippery Rock, Butler
Geo. A. Hogg....24th & R. R. Sts., Pittsburg
Powell Bros.............Shadeland, Crawford

#### PERCHERONS.

J. H. Kidd.........................Mars, Butler
D. S. Kloss.......................Tyrone, Blair
A. M. Dickson & Son..Cochranton, Crawford
E. B. Boyle........Canonsburg, Washington
J. M. Main & Sons..Shippensburg, Cumberl'd
Geo. A. Hogg....24th & R. R. Sts., Pittsburg
W. A. McCoy & Sons..........Mercer, Mercer
Powell Bros.............Shadeland, Crawford
Lyman Hunter..........Hartstown, Crawford
Wm. F. Gable..............Wyebrook, Chester
John W. Burket..................Tyrone, Blair
W M. Lyon & Son......Wyalusing, Bradford

#### THOROUGHBREDS.

R. S. Hartley...........Youngsville, Warren

#### HACKNEYS.

Geo. A. Hogg....24th & R. R. Sts., Pittsburg
Powell Bros.............Shadeland, Crawford
Lyman Hunter..........Hartstown, Crawford

#### SHETLAND PONIES.

Wm. F. Gable..............Wyebrook, Chester
W. M. Thompson........Uniontown, Fayette
F. B. Stewart.............Espyville, Crawford
Powell Bros.............Shadeland, Crawford

### CATTLE.

#### ABERDEEN-ANGUS.

C. L. Taggart......Washington, Washington
W. H. Rink..............Johnstown, Cambria
W. L. Christley........Slippery Rock, Butler
Jas. Blair................Hartstown, Crawford
Bayard Bros............Waynesburg, Greene
Penn'a State College....State College, Center
Geo. Black..................Dayton, Armstrong
Lyman Hunter..........Hartstown, Crawford

#### AYRSHIRES.

W. W. Blake Arkcoll..........Paoli, Chester
E. L. & Sidney Roberts......Malvern, Chester
Willis W. Hopkins..........Aldenville, Wayne

#### BROWN SWISS.

R. I. Young.............Middletown, Dauphin
W. H. H. Riddle................Butler, Butler

#### DEVONS.

B. F. Jones............South Montrose, Susq.
A. S. Worden..................Frederick, Md.
J. Cheston Morris........Westchester, Chester
Powell Bros.............Shadeland, Crawford

#### POLLED ALBIONS.

B. E. Ferris....................Hector, Potter

#### HOLSTEINS.

Herman Straub..........Pittsburg, Allegheny
T. J. Erdley..................Lewisburg, Union
W. T. Suter......Riverside, Northumberland
Sam'l McCreary..............Volant, Lawrence
H. M. Lyon & Sons....Wyalusing, Bradford
J. B. Henderson..Burgettstown, Washington
B. F. Jones...........South Montrose, Susq.
A. S. Worden..................Frederick, Md.
Geo. G. Paxton..........Houston, Washington
W. E. Stevenson..Burgettstown, Washington
D. S. Kloss.......................Tyrone, Blair
J. M. Quivey & Sons...Houston, Washington
J. M. Paxton...........Houston, Washington
Powell Bros.............Shadeland, Crawford
D. E. Notestine...........Lewistown, Mifflin
Nelson Poorbaugh.Mt. Pleasant, Westmorel'd

### POLLED DURHAMS.

D. C. Andrews......West Newton, Westm'd
Lee R. Scott......Burgettstown, Washington
Chas. Buchanan...............Utica, Venango
J. C. Mattern & Sons....Holidaysburg, Blair

### RED POLLS.

M. G. King......................Mt. Wolf, York
B. E. Ferris......................Hector, Potter
N. O. Brownlee..........Crothers, Washington
A. M. Dickson & Son..Cochranton, Crawford
D. Norman App..........Selinsgrove, Snyder
John F. Zook................Belleville, Mifflin
Sidney T. Isett....Spruce Creek, Huntingdon

### SHORTHORNS.

W. J. Sturgeon........Kittanning, Armstrong
C. A. Hershey..............Gettysburg, Adams
W. M. Thompson........Uniontown, Fayette
F. N. Hubbard................Troy, Bradford
John A. Cummins........Waynesburg, Greene
Geo. G. Strosnider........Waynesburg, Greene
G. D. Walker...................Salona, Clinton
J. L. Stauffer......Southwest, Westmoreland
A. S. Eagleson & Sons....Washington, Wash.
Jos. T. Fleming..............Belleville, Mifflin
W. J. Monroe......Greensburg, Westmoreland
W. C. Black.....................Mercer, Mercer
B. L. Post's Sons....West Alexander, Wash.
L. Douthett..............Thornhill, Allegheny
W. A. McCoy & Sons..........Mercer, Mercer
Lee R. Scott......Burgettstown, Washington
Penn'a State College....State College, Center
A. G. Shaffer........Rural Valley, Armstrong
L. D. May.........Granville Center, Bradford
R. C. Vance........Burgettstown, Washington
R. L. Munce.........Canonsburg, Washington
D. H. Waite....Warrior's Mark, Huntingdon
E. B. Boyle.........Canonsburg, Washington

### GUERNSEYS.

W. H. Ridge.....................Trevose, Bucks
R. S. Nicholson & Sons....Kittanning, Arm'g
B. F. Gabler & Son.......Greensboro, Greene
T. M. McKee.............Lewistown, Mifflin
Penn'a State College....State College, Center
J. E. Woodmansee........Lake Como, Wayne
Nelson Poorbaugh....Mt. Pleasant, Westm'd.
Wm. F. Gable.............Wyebrook, Chester
R. S. Hartley...........Youngsville, Warren
Irwin F. McKee....Washington, Washington
H. H. Snavely......Willow Street, Lancaster
Wm. Thompson, Jr...........Lemont, Center
Geo. G. Paxton..........Houston, Washington
J. H. Peachy..................Belleville, Mifflin
H. C. Bughman...Greensburg, Westmoreland
R. F. Shannon......907 Liberty St., Pittsburg
Henry Palmer.............Avondale, Chester
H. W. Comfort.............Fallsington, Bucks
R. S. Love........Mt. Pleasant, Westmoreland
Shook Bros...............Spring Mills, Center

### JERSEYS.

R. S. Love........Mt. Pleasant, Westmoreland
R. S. Nicholson & Sons..Kittanning, Arm'g
Jno. W. Bronson.........New Galilee, Beaver
Jas. I. Thompson.............Lemont, Center
Chas. A. Porter......Torresdale, Philadelphia
Ludwig S. Filbert....Fox Chase, Philadelphia
Geo. S. Barnhart..Greensburg, Westmoreland
R. I. Young.............Middletown, Dauphin
Geo. Erk.......................Seelyville, Wayne
B. W. McKeehan.......Mt. Rock, Cumberland
A. L. Martin..............Harrisburg, Dauphin
Edward Walter........West Chester, Chester
A. P. Warren............Elizabeth, Allegheny
Jas. H. Cowan..........Duquesne, Allegheny
J. M. Main & Sons..Shippensburg, Cumberl'd
John B. Kepple...Greensburg, Westmoreland
W. F. Shrum......Adamsburg, Westmoreland
M. P. Shoemaker & Bro..Greensburg, West.
G. H. Knapp................Aldenville, Wayne
L. W. Lighty.............East Berlin, Adams
R. S. Hartley...........Youngsville, Warren
J. I. Barley..........Baker's Summit, Bedford
W. E. & J. J. Perham......Niagara, Wayne
W. C. Norton.................Waymart, Wayne
S. E. Nivin.............Landenburg, Chester
A. T. Replogle............Waterside, Bedford
Austin Leonard & Son........Troy, Bradford
W. F. Wagner..Harrison City, Westmorel'd
Clarence M. Glasgow....Calvin, Huntingdon
Herman Hoopes..........Westchester, Chester
W. W. Harrison..119 N. 11th St., Philadelphia
R. F. Shannon......907 Liberty St., Pittsburg
Henry H. Randt..............Pipersville, Bucks
J. B. Wylie.........Washington, Washington
W. F. McSparran..........Furniss, Lancaster
E. B. Boyle.........Canonsburg, Washington
J. H. Silvis........Greensburg, Westmoreland
M. E. Reeder................Muncy, Lycoming
T. M. Shively.............Mifflinburg, Union
T. A. Schierer.............Slatington, Lehigh

## SWINE.

### BERKSHIRES.

Jno. W. Bronson.........New Galilee, Beaver
T. J. Erdley...................Lewisburg, Union
W. T. Kennedy.......................Mars, Butler
J. H. Silvis................Greensburg, West'ld
A. L. Martin.........Enon Valley, Lawrence
J. N. Glover..................Vicksburg, Union
A. S. Worden..................Frederick, Md.
R. W. Crothers & Son....Taylorstown, Wash.
Edward Walter.........Westchester, Chester
J. M. Main & Sons..Shippensburg, Cumberl'd
Nelson Poorbaugh....Mt. Pleasant, Westm'd
Sam'l McCreary.............Volant, Lawrence
Jas. L. Henderson..Washington, Washington
L. W. Lighty.............East Berlin, Adams
A. H. Erdman.............Wiconisco, Dauphin
J. B. Henderson..Burgettstown, Washington
G. D. Walker..................Salona, Clinton
Ralph Minner & Sons..........Mercer, Mercer
J. Cheston Morris........Westchester, Chester
T. M. Shively..............Mifflinburg, Union
W. C. Black....................Mercer, Mercer
Homer Bros..................Greenville, Mercer
H. C. Bughman..Greensburg, Westmoreland
R. F. Shannon............Pittsburg, Allegheny
A. S. Eagleson & Sons....Washington, Wash.
N. O. Brownlee..........Crothers, Washington
S. V. McDowell & Son......Fredonia, Mercer
W. F. McSparran..........Furniss, Lancaster
J. M. Paxton...........Houston, Washington
W. F. Holtzer....Greensburg, Westmoreland
W. H. Gray.............Brookville, Jefferson
D. H. Waite....Warrior's Mark, Huntingdon
T. J. Erdley.................Lewisburg, Union

### DUROC-JERSEYS.

Wm. Thompson, Jr...........Lemont, Center
B. L. Post's Sons....West Alexander, Wash.
George Black.............Dayton, Armstrong
S. S. Blyholder.............Neale, Armstrong
D. E. Notestine............Lewistown, Mifflin
Sidney T. Isett....Spruce Creek, Huntingdon
G. I. Fugate.................Ellsworth, Wash.
R. S. Nicholson Sons....Kittanning, Arms'g

### CHESTER WHITES.

Peter B. Cowan...........Brookville, Jefferson
Herman Straub...........Pittsburg, Allegheny
G. S. Barnhart....Greensburg, Westmoreland
H. M. Lyon & Sons....Wyalusing, Bradford
J. C. Mattern & Sons....Hollidaysburg, Blair
R. L. Munce..........Canonsburg, Washington
Edward Walter..........Westchester, Chester
A. P. Warren...........Elizabeth, Allegheny
J. E. Woodmansee........Lake Como, Wayne
Benj. McKeehan........Mt. Rock, Cumberland
W. F. Gable.............Wyebrooke, Chester
H. M. Lyon & Sons......Wyalusing, Bradford
Willis W. Hopkins.........Aldenville, Wayne
F. W. Levis...........Chadd's Ford, Chester
A. T. Replogle...........Waterside, Bedford

Jos. T. Fleming..............Belleville, Mifflin
W. J. Monroe.....Greensburg, Westmoreland
D. S. Kloss.......................Tyrone, Blair
Sidney T. Isett....Spruce Creek, Huntingdon
W. A. McCoy & Sons..........Mercer, Mercer
A. M. Dickson & Son (O I C)
Cochranton, Crawford
S. V. McDowell & Son......Fredonia, Mercer
D. W. Jones...................Wilmore, Cambria
J. H. Silvis........Greensburg, Westmoreland
J. N. Glover..................Vicksburg, Union
E. B. Boyle..........Canonsburg, Washington
T. M. McKee................Lewistown, Mifflin
R. C. Vance......Burgettstown, Washington

### OZARK OR MULE FOOT HOGS.

A. M. Dickson & Son..Cochranton, Crawford

### POLAND-CHINAS.

G. I. Fugate..........Ellsworth, Washington
W. J. Sturgeon........Kittanning, Armstrong
W. M. Thompson..........Uniontown, Fayette
J. C. Mattern & Sons....Hollidaysburg, Blair
D. Norman App............Selinsgrove, Snyder
A. G. Shaffer........Rural Valley, Armstrong
A. P. Warren............Elizabeth, Allegheny
Edward Walter..........Westchester, Chester
C. A. Hershey..............Gettysburg, Adams
W. F. Wagner..Harrison City, Westmoreland
J. L. Stouffer......Southwest, Westmoreland
Burns & Adams............Imperial, Allegheny
J. H. Peachey................Belleville, Mifflin
T. M. McKee................Lewistown, Mifflin
R. S. Love......Mt. Pleasant, Westmoreland
T. M. Shively..................Mifflinburg, Union

### CHESHIRES.

B. F. Gabler & Sons........Greensboro, Greene

### IMPROVED YORKSHIRE.

H. C. Bughman..........Greensburg, West'ld

### TAMWORTHS.

R. S. Hartley.............Youngsville, Warren

## SHEEP.

### BLACKTOP MERINOS.

John M. Berry......Wylandville, Washington
R. P. Berry..........Eighty-four, Washington
R. L. Munce..........Canonsburg, Washington
E. B. Boyle..........Canonsburg, Washington

### DELAINE MERINOS.

Geo. G. Paxton..........Houston, Washington
Lee R. Scott......Burgettstown, Washington
E. B. Boyle..........Canonsburg, Washington
B. L. Post's Sons....West Alexander, Wash.
R. W. Crothers & Son....Taylorstown, Wash.
A. L. Martin..........Enon Valley, Lawrence

### CHEVIOT.

S. V. McDowell & Son........Fredonia, Mercer

### SOUTHDOWNS.

Ludwig S. Filbert....Fox Chase, Philadelphia
Edward Walter..........Westchester, Chester
W. A. McCoy & Sons..........Mercer, Mercer
R. C. Vance........Burgettstown, Washington

### DORSETS.

T. M. McKee................Lewistown, Mifflin
A. S. Eagleson......Washington, Washington
J. B. Henderson..Burgettstown, Washington
S. Shaffer...............New Castle, Lawrence
J. B. Wylie..........Washington, Washington
Henry Palmer.............Avondale, Chester
A. M. Dickson & Son..Cochranton, Crawford

### LINCOLNS.

R. S. Nicholson & Sons.....Kittanning, Arm'g
Benj. McKeehan........Mt. Rock, Cumberland
T. M. Shively................Mifflinburg, Union
W. A. McCoy & Sons..........Mercer, Mercer

### COTSWOLDS.

S. V. McDowell & Son......Fredonia, Mercer
R. S. Love........Mt. Pleasant, Westmoreland

### HAMPSHIRES.

W. J. Monroe.....Greensburg, Westmoreland
Jas. Blair................Hartstown, Crawford
Edward Walter..........Westchester, Chester
A. M. Dickson & Son..Cochranton, Crawford

### LEICESTERS.

W. A. McCoy & Sons..........Mercer, Mercer

### OXFORDS.

A. M. Dickson & Son......Cochranton, Mercer
A. G. Shaffer........Rural Valley, Armstrong
A. S. Worden...................Frederick, Md.

### SPANISH MERINOS.

Jas. Lindsay & Sons..........Utica, Venango
Lee R. Scott........Burgettstown, Washington

### SHROPSHIRES.

A. L. Martin..........Enon Valley, Lawrence
J. C. Mattern & Sons....Hollidaysburg, Blair
J. F. Lantz & Co..........Wyebrooke, Chester
Edward Walter..........Westchester, Chester
Wm. F. Gable............Wyebrooke, Chester
C. A. Hershey..............Gettysburg, Adams
S. Shaffer..............New Castle, Lawrence
A. T. Replogle..............Waterside, Bedford
Jos. T. Fleming..............Belleville, Mifflin
Clarence M. Glasgow......Calvin, Huntingdon
W. C. Black.....................Mercer, Mercer
B. L. Post's Sons....West Alexander, Wash.
Sidney T. Isett......Spruce Creek, Huntingdon
Herman Hoopes..........Westchester, Chester
D. S. Kloss.......................Tyrone, Blair
J. C. Andrews..................Mattie, Bedford
Wm. Thompson................Lemont, Center
John W. Burket..................Tyrone, Blair
D. W. Jones.................Wilmore, Cambria

### SUFFOLK.

A. M. Dickson & Son......Cochranton, Mercer

### BLACKFACED HIGHLAND.

A. M. Dickson & Son....Cochranton, Mercer

### ANGORA GOATS.

R. S. Love......Mt. Pleasant, Westmoreland
A. M. Dickson & Son..Cochranton, Crawford

## POULTRY.

### PLYMOUTH ROCKS.

W. F. McSparran..........Furniss, Lancaster
W. C. Norton................Aldenville, Wayne
Edwin Johnson............Taylorsville, Bucks
Jno. W. Bronson.........New Galilee, Beaver
Herman Straub..........Pittsburg, Allegheny
W. T. Kennedy...................Mars, Butler
W. J. Monroe.....Greensburg, Westmoreland
W. T. Suter (W)..Riverside, Northumberland
J. A. Herr (B)................Mill Hall, Clinton
M. N. Clark (B)........Claridge, Westmoreland
Edward Walter..........Westchester, Chester
J. F. Lantz & Co..........Wyebrooke, Chester
Penn'a State College....State College, Center
A. P. Warren (B&Buff).Elizabeth, Allegheny
T. M. McKee (B)..........Lewistown, Mifflin
D. N. App (B & W)........Selinsgrove, Snyder
Jas. H. Cowan............Duquesne, Allegheny
Nelson Poorbaugh (Wh)..Mt. Pleasant, West.
C. A. Hershey (B)..........Gettysburg, Adams

M. P. Shoemaker & Bro. (W).Greensbg, West.
W. H. Gray (B)..........Brookville, Bradford
H. M. Lyon & Sons (B)..Wyalusing, Bradford
D. W. Jones..................Wilmore, Cambria
Geo. S. Barnhart..Greensburg, Westmoreland
Wm. Thompson...............Lemont, Center
Sidney T. Isett....Spruce Creek, Huntingdon
J. I. Barley..........Baker's Summit, Bedford
John A. Cummins (B)...Waynesburg, Greene
G. D. Walker..................Salona, Clinton
A. T. Replogle.............Waterside, Bedford
Dr. J. Stewart Lacock (Wh)..Pittsburg, Ally.
W. F. Wagner (B)...Harrison City, Westm'd
J. L. Stouffer (B)...Southwest, Westmoreland
Jos. T. Fleming (Wh)........Belleville, Mifflin
Burns & Adams..........Imperial, Allegheny
Wm. Thompson, Jr. (B)........Lemont, Center
J. H. Peachey (B)...........Belleville, Mifflin
J. Wolf Evans (Bf)........Spring Mills, Center
Herman Hoopes (B)......Westchester, Chester
A. S. Eagleson & Sons (B).Washington, Wash.
N. O. Brownlee (B)......Crothers, Washington
S. V. McDowell & Sons (B)..Fredonia, Mercer
Henry Palmer (Bf)..........Avondale, Chester
J. C. Andrews (B).............Mattie, Bedford
W. A. McCoy & Sons (Wh)...Mercer, Mercer
Nelson Bros. (B)..........Grove City, Mercer
Penn'a State College (B).State College, Center
R. S. Love (W)..Mt. Pleasant, Westmoreland
J. M. Paxton (Bf)........Houston, Washington
J. H. Silvis........Greensburg, Westmoreland
D. H. Waite.....Warrior's Mark, Huntingdon
D. E. Notestine............Lewistown, Mifflin
Shook Bros..............Spring Mills, Center

### COCHINS.

J. N. Glover (B)............Vicksburg, Union
Pa. State College.......State College, Center
John M. Berry (Wh)..Wylandville, Wash'gt'n

### RHODE ISLAND REDS.

R. F. Shannon..Edgeworth Station, Allegheny
W. H. Knarr......Greensburg, Westmoreland
Pa. State College.......State College, Center
D. Norman App............Selinsgrove, Snyder

### ORPINGTONS.

R. F.Shannon.............Pittsburg, Allegheny
J. N. Glover.....................Vicksburg, Union

### BLACK POLISH.

Pa. State College (WC)..State College, Center

### WYANDOTTES.

S. Shaffer................New Castle, Lawrence
R. S. Nicholson & Sons....Kittanning, Arm'g
Herman Straub (Wh)....Pittsburg, Allegheny
Jas. I. Thompson (W).........Lemont, Center
Pa. State College.........State College, Center
Julius LeMoyne (Wh).....Washington, Wash.
F. E. Traver (Buff........Wyebrooke, Chester
R.W.Crothers & Son (W).Taylorstown, Wash.
A. G. Shaffer (Sil)...Rural Valley, Armstrong
Wm. F. Gable (Bf)........Wyebrooke, Chester
C. A. Hershey (Wh).......Gettysburg, Adams
L. W. Lighty (Wh)........East Berlin, Adams
D. W. Jones..................Wilmore, Cambria
B. F. Jones (Wh).......South Montrose, Susq.
Dr. J. Stewart Lacock (Wh)...Pittsburg Ally.
W. F. Holtzer (Bf)..Greensburg, Westmorel'd
B. L. Post's Sons (Wh)..W. Alexander, Wash.
Homer Bros. (Bf)...........Greenville, Mercer
H. C. Bughman (SL)....Greensburg, Westm'd
H. H. Snaveley..........Willow Street, Lanc.
D. S. Kloss (Wh).................Tyrone, Blair
Ezra Michener.................Michener, Bucks
R. S. Love (W).....Mt. Pleasant. Westmorel'd

### MINORCAS.

Wm. F. Gable.............Wyebrooke, Chester
R. S. Hartley...............Youngsville, Warren
Pa. State College (Blk)..State College, Center
R. F. Shannon (Bl)......Edgeworth Sta., Ally.

### BRAHMAS

Edward Walter...........Westchester, Chester
B. E. Ferris (Lt)................Hector, Potter
Clarence M. Glasgow (Lt)..Calvin, Hunt'don
Pa. State College (Lt)...State College, Center

### LEGHORNS.

R. F. Shannon...........Edgeworth Sta., Ally.
Jas. Lindsey & Son (R C B)..Utica, Venango
W. T. Suter (R C W)...Riverside, Northum'ld
G. S. Barnhart (Bf)....Greensburg, Westm'd
J. Wolf Evans (Scw W & B), Spng Mills, Cen.
R. L. Munce (S C B).....Canonsburg, Wash.
J. E. Woodmansee (Scw)..Lake Como, Wayne
A. P. Warren (Bf)........Elizabeth, Allegheny
Nelson Poorbaugh (Wh), Mt. Pleasant, West'd
M. P. Shoemaker & Bro. (Br), Gr'nsb'g,West.
W. H. Gray (Wh)........Brookville, Jefferson
L. W. Lighty (Wh).........East Berlin, Adams
Willis W. Hopkins (Br).....Aldenville, Wayne
R. S. Hartley (Bf & Br).Youngsville, Warren
Geo. G. Strosnider (Br)..Waynesburg, Greene
B. L. Post's Sons (RCB).W.Alexander, Wash.
H. C. Bughman (Br)...Greensburg, Westm'd
Nelson Bros. ( C B).......Grove City, Mercer
Pa. State College SCW)..State College, Cent'r
R. S. Love ( & W)...Mt. Pleasant, Westm'ld
W. F. Holtzer (Wh)....Greensburg, Westm'ld

### BANTAMS.

H. C. Bughman..Greensburg, Westmoreland
W. A. McCoy (WhG)..........Mercer, Mercer
R. F. Shannon (BBRGame)..Edgeworth Sta., ..............................Allegheny
R. S. Hartley (Bf Coch)..Youngsville, Warren
E. B. Boyle..........Canonsburg, Washington

### GAMES

Pa. State College.........State College, Center
R. F. Shannon....Edgeworth Sta., Allegheny

### FAVEROLLES.

Pa. State College.........State College, Center

### PEAFOWLS.

J. C. Andrews..................Mattie, Bedford
W. A. McCoy & Sons..........Mercer, Mercer
D. W. Jones................Wilmore, Cambria

### GUINEAS.

R. S. Nicholson & Sons.....Kittanning, Arm'g
W. A. McCoy & Sons (Wh)....Mercer, Mercer

### FERRETS.

Nelson Bros................Grove City, Mercer

### DUCKS.

G. I. Fugate (Mus)..........Ellsworth, Wash.
Benj. McKeehan (Pekin)..Mt. Rock, Cumb'd
W. H. Gray (Pekin)......Brookville, Jefferson
W. A. McCoy & Sons..........Mercer, Mercer

### TURKEYS.

Jno. M. Berry (WhH).....Wylandville, Wash.
B. L. Post's Sons (MB).....Claysville, Wash.
A. G. Shaffer.........Rural Valley, Armstrong
D. N. App (WHol)........Selinsgrove, Snyder
W. H. Gray (Br)..........Brookville, Jefferson
B. F. Jones (Bl)........South Montrose, Susq.
J. L. Stouffer (Br)...Southwest, Westmorel'd
Clarence M. Glasgow (Br)..Calvin, Hunting'n
Henry H. Randt............Pipersville, Bucks
J. B. Wylie (WH)..Washington, Washington
W. A. McCoy & Sons (WH). Mercer, Mercer
D. W. Jones.................Wilmore, Cambria

### WHITE-TIPPED BLACK SPANISH.

Pa. State College.........State College, Center

### GEESE.

W. J. Monroe (Tou)...........Greensburg, Pa.
W. H. Gray (Tou).......Brookville, Jefferson
W. A. McCoy & Sons (Emb)...Mercer, Mercer

### BUCKEYE REDS.

J. H. Peachy..................Belleville, Mifflin

### BLUE SPANISH.

G. T. Fugate..........Ellsworth, Washington

## DOGS.

### SCOTCH COLLIES.

Austin Leonard & Son........Troy, Bradford
Clarence M. Glasgow......Calvin, Huntingdon
J. C. Andrews..................Mattie, Bedford
Nelson Bros................Grove City, Mercer
D. W. Jones.................Wilmore, Cambria
Benj. McKeehan......Mt. Rock, Cumberland
M. P. Shoemaker & Bro..Greensburg, West.
W. H. Gray...............Brookville, Jefferson
H. M. Lyon & Sons......Wyalusing, Bradford
R. S. Hartley.............Youngsville, Warren
J. I. Barley.........Baker's Summit, Bedford
F. B. Stewart...............Espyville, Crawford
Nelson Bros...............Grove City, Mercer
T. M. McKee................Lewistown, Mifflin

### SCOTCH TERRIERS.

R. F. Shannon...........Pittsburg, Allegheny

### BULL TERRIERS.

W. C. Norton................Waymart, Wayne

### ENGLISH SHEEP DOGS.

Benj. McKeehan.......Mt. Rock, Cumberland

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### BEAGLES.

J. F. Lantz & Co.........Glenmoore, Chester

### ANGORA CATS.

E. L. & Sidney Roberts......Malvern, Chester

# The Grange Exhibit Trophy.

*The above splendid Silver Cup was donated by the National Stockman and Farmer, Pittsburgh, Pa., for the best exhibit of fifty ears of corn by a*

SUBORDINATE GRANGE

---

# The Grand Champion Trophy.

*The above splendid Silver Cup was donated by the American Agriculturist, New York, New York, for the*

GRAND CHAMPIONSHIP

*Best Ten Ears of Corn*
*in the 1909 Show*

# Pennsylvania's Third Annual Corn Show.

Third Annual Corn Show held by the Pennsylvania Live Stock Breeders' Association at its Annual Meeting, Chestnut Street Hall, Harrisburg, Pa., Jan. 26-29, 1909, with Penn'a Dairy Union and Penn'a State Board of Agriculture.

## CLASSES:

**CLASS A—Yellow Dent**—For the best exhibit of Yellow Dent corn, consisting of ten ears: 1st prize, $25 Silver Cup donated by **Dr. Thos. Turnbull,** Pittsburgh, Pa.; 2d prize, $7.50; 3d prize, $5; 4th prize, $3; 5th, 6th, 7th, 8th, 9th and 10th prizes, $1 each.

**CLASS B—White Capped Yellow Dent**—For the best exhibit of White Capped Yellow Dent corn, consisting of ten ears: 1st prize, $25 Silver Cup donated by **Faculty of Penn'a Agricultural College,** State College, Pa.; 2d prize, $7.50; 3d prize, $5; 4th prize, $3; 5th, 6th, 7th, 8th, 9th and 10th prizes, $1 each.

**CLASS C—White Dent**—For the best exhibit of White Dent corn, consisting of ten ears: 1st prize, $25 Silver Cup donated by the **Faculty of the Veterinary College of the University of Pennsylvania,** Philadelphia, Pa.; 2d prize, $7.50; 3d prize, $5; 4th prize, $3; 5th, 6th, 7th, 8th, 9th and 10th prizes, $1 each.

**CLASS D—Ninety-Day Type**—For the best exhibit of Ninety-Day Type of corn, consisting of ten ears: 1st prize, $25 Silver Cup donated by **Department of Agriculture,** Harrisburg, Pa.; 2d prize, $7.50; 3d prize, $5; 4th prize, $3; 5th, 6th, 7th, 8th, 9th and 10th prizes, $1 each.

**CLASS E—Flint**—For the best exhibit of Flint corn, consisting of ten ears: 1st prize, $25 Silver Cup donated by **Hon. Vance C. McCormick,** Harrisburg, Pa.; 2d prize, $5; 3d prize, $3; 4th prize, $2; 5th, 6th, 7th, 8th, 9th and 10th prizes, $1 each.

**CLASS G—Grange Exhibits**—For the best fifty ears of corn, any variety or type, exhibited by a Subordinate Grange, a $50 Silver Cup donated by **The National Stockman and Farmer,** Pittsburgh, Pa.; 2d prize, a $25 Silver Cup donated by **Hon. Vance C. McCormick,** Harrisburg, Pa.

**Grand Championship**—For the best ten ears of corn in the Show, a $50 Silver Cup donated by **The American Agriculturist,** New York, N. Y.

**Champion Ear**—For the best ear of corn in the Show, Silver Plate donated by **R. F. Shannon,** breeder of Jersey cattle, Pittsburgh, Pa.

## RULES.

The following regulations shall govern the contest:

Each exhibit shall consist of ten ears of corn, except Subordinate Grange exhibits, which shall consist of fifty ears.

The corn in the Grange exhibits may be furnished by any or all members of the Grange which enters the exhibit.

No individual exhibitor may enter more than 10 ears in the same class.

The Champion Ear may be selected from any exhibit; the Champion ten ears from any class except the Grange exhibits.

Competition is limited to corn-growers of Pennsylvania. No seedsman or employe of a seedsman will be allowed to compete.

All corn shown must have been grown by exhibitor in Pennsylvania in 1908.

It is impossible to return corn or packages, and all corn shown will become the property of the Pennsylvania Live Stock Breeders' **Association.**

No entrance or other fees will be charged. Everything is free.

Unclassified corn will be classified by the judges. Exhibitors are requested to fill out **entry blanks** which will be furnished on application to E. S. Bayard, East End, Pittsburg, Pa.

The corn will be judged by Dr. Thos. F. Hunt, Dean of Pennsylvania College of Agriculture, and Prof. F. D. Gardner, Agronomist Pennsylvania Experiment Station. There shall be no appeal from any decision rendered by these judges.

**All corn must be consigned to W. H. Moody, Chestnut Street Hall, Harrisburg, Pa.,** and must be in his hands by Monday, January 25. All charges must be prepaid by the shipper.

Every exhibitor must place on the **inside of package** containing his corn an entry blank or a card giving his **name** and **address.** This card will be removed and a number substituted until the judging is completed.

The corn will be judged on Tuesday, January 26, and no entries can be accepted after **Monday evening, January 25.**

Exhibitors must keep all marks of identity off exhibits until judging is completed.

All cups become the absolute property of the winners.

GLENFREW FARM

Edgeworth Station, Allegheny County, Pa.
and 907 Liberty Street, Pittsburg, Pa.

JERSEY CATTLE
Milk-Butter-Quality

BERKSHIRE HOGS
Good Ones
All Registered Stock

RHODE ISLAND REDS

LEGHORNS

AIREDALE AND SCOTCH TERRIERS
The kind that are tractable, mind their own business
and go for tramps and vermin

W. J. MONROE
BREEDER OF

Chester White Swine
Short-Horn Cattle and
Plymouth Rock Fowls

BREEDING STOCK FOR SALE
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GUERNSEY CATTLE
Young Bulls bred from Prize
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Producing Dams.
B. F. GABLER & SON,
Greensboro, Pa.

RED POLL CATTLE!
Reg. Heifers and Bulls
For Sale at all times.
M. G. KING,
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*Advertisements for the next Annual Report will be accepted at the following rates: One page $10; one-half page $6; one-fourth page $3; one inch $1. Four thousand copies will be distributed.*

## Little Giant Stock Food-Tonic

*Composed of*

| | |
|---|---|
| Sterilized Meat-Meal | Sterilized Ground-Blood |
| Sterilized Bone-Flour | C. P. Charcoal |

Imported German Fennel Seed
Imported French Gentian Root
Imported African Fenugreek Seed
Imported Spanish Licorice Root

*GUARANTEED ANALYSIS*

| | | |
|---|---|---|
| Crude Protein | 28 | per ct. |
| Crude Fat | 12 | " |
| Crude Fibre* | 15 | " |
| Phosphorus | 4 | " |
| Calcic Phosphate | 22 | " |

*Fibre from meat-meal and roots only; no grain chaff, middlings, screenings or other "filler" of any kind used in this food-tonic.

*Made by*

LITTLE GIANT FOOD COMPANY
NEWARK, N. J.

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HEN-E-TA BONE-GRITS

NO OTHER BONE NEEDED | NO OTHER GRIT NEEDED

NO MORE BONE CUTTERS NEEDED

100 LB. BAG $2.25 | 50 LB. BAG $1.50

30 % PURE BONE ASH

VALUABLE BOOKLET FREE

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PRICES AND TERMS

ON

"Little Giant" Stock Food

AND

"Hen-e-ta" Bone Grits

# END OF YEAR

Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1909

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1909

Master Negative Storage Number: MNS# PSt SNPaAg057.8

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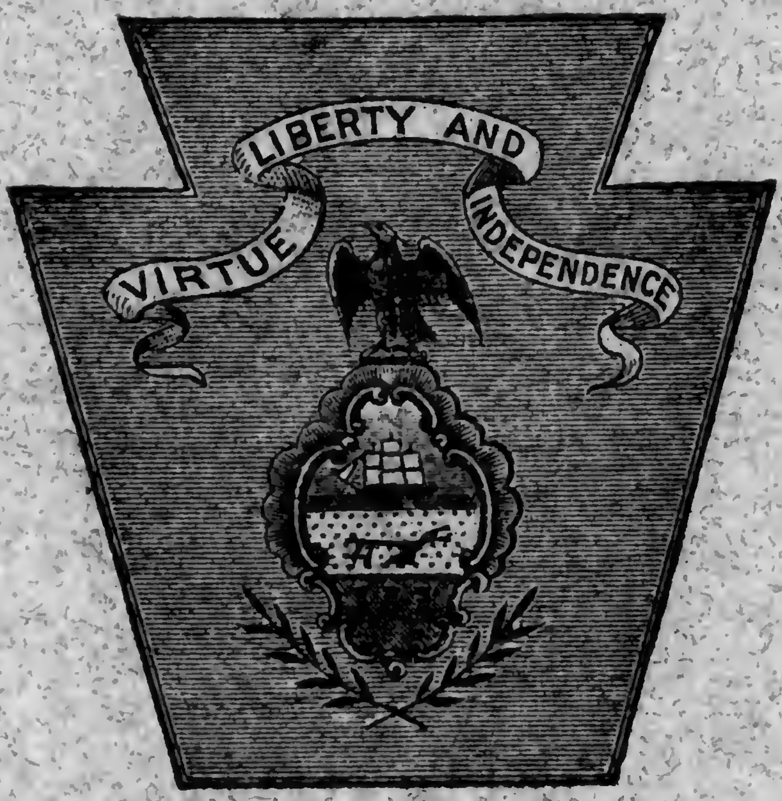
# ELEVENTH ANNUAL MEETING

—OF—

# PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION



HELD AT

HARRISBURG, PA.

JANUARY 25 AND 26, 1909

JOINT MEETING WITH THE PENNSYLVANIA LIVE STOCK
BREEDERS' ASSOCIATION

# PROCEEDINGS AND PAPERS
OF
# ELEVENTH ANNUAL MEETING
OF
# THE PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION
AND THE
# PENNSYLVANIA DAIRY UNION

Held at Harrisburg, January 25-26, 1909

**Officers of Breeders' Association:**

President, - - - HON. W. C. NORTON, Waymart
First Vice-President DR. LEONARD PEARSON, Philadelphia
Second Vice-President - M. P. SHOEMAKER, Greensburg
Secretary - - - E. S. BAYARD, Pittsburg
Treasurer - - - - J. F. LANTZ, Wyebrooke

**Officers of Dairy Union:**

President - - - - W. E. PERHAM, Niagara, Pa.
Vice-President - - - - J. G. REIST, Mt. Joy, "
Secretary - - H. E. VanNORMAN, State College, "
Treasurer - - W. D. MARSHALL, Lyndell, "

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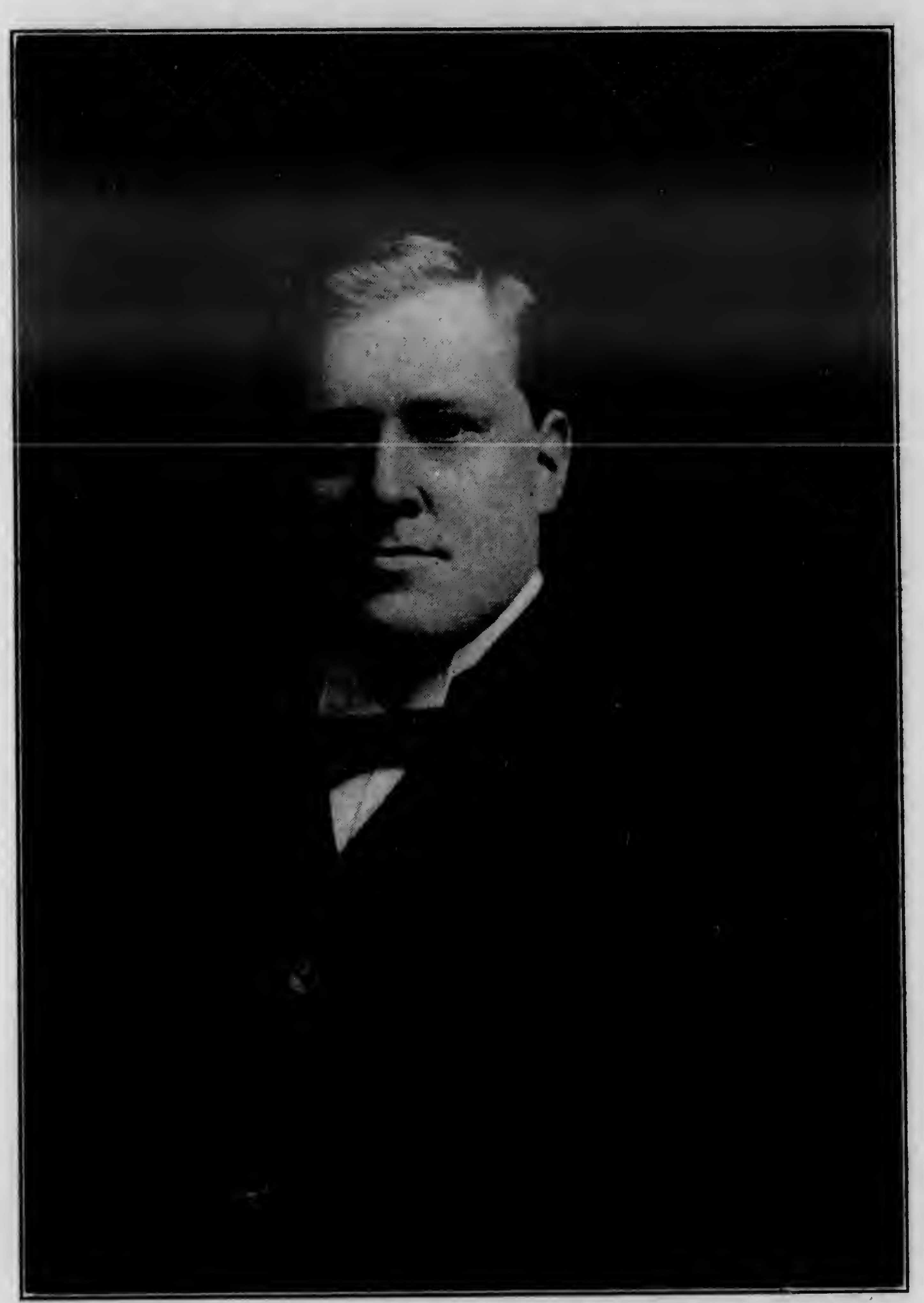

LEONARD PEARSON, B.S., V.M.D.

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INTENTIONAL SECOND EXPOSURE

at Cornell he became interested in veterinary work, and in 1887 he was employed by the United States Department of Agriculture under Prof. James Law, his lifelong friend, in assisting to stamp out contagious pleuro-pneumonia of cattle in the vicinity of Chicago.

He graduated from the University of Pennsylvania, Veterinary Department, with the class of 1890. The following years of 1890-91 he attended lectures in the veterinary schools of Berlin and Dresden and studied bacteriology in Koch's Laboratory and in the Laboratory of the Veterinary Department of the German Army. On his return to America he was elected assistant professor of theory and practice of veterinary medicine in the University of Pennsylvania and in 1894 was promoted to a full professorship. In 1897 he was elected Dean of that institution, a position which he has since filled with conspicuous ability. In recognition of his research work, the university in 1908 conferred on him the honorary degree of Doctor of Medicine.

In 1892 he was appointed non-resident lecturer on veterinary science at the Pennsylvania State College.

He was a member of and attended the Seventh International Congress of Hygiene and Demography, held in London in 1891, and the Third International Congress for the Study of Tuberculosis that met in Paris in 1898, and in recognition of the services rendered in the study of animal tuberculosis he was chosen to preside over the section on animal tuberculosis at the Congress held in Washington in 1908.

He was one of the founders and editors of the "Veterinary Magazine," and the author of numerous papers on veterinary and sanitary subjects. He was a prolific writer and contributor to the literary field of veterinary science, the domain of agriculture, the stock-breeding interests and the whole realm of animal industry and had justly earned the proud title of the leading "animal engineer" of America.

As Secretary, then President, he filled the highest offices in the American Veterinary Medical Association, and served two terms as President of the Pennsylvania State Veterinary Medical Association, and the same may be said of him in reference to the Keystone Veterinary Medical Society. He was an active member and past President of the Guernsey Cattle Club of Philadelphia, Vice-President of the Pennsylvania Live Stock Breeders' Association, member of the State Grange. American Public Health Association, Philadelphia City Board of Health, advisory member of the State Board of Health, and Veerinarian to the State Board of Agriculture. He was a member of Ivanhoe Lodge, F. and A. M., and an active member of the Harrisburg Club, the University Club and the Union and West Philadelphia Republican Clubs. In all these organizations his genial manner won him hosts of friends. In all his association work he was active and aggressive and furnished most valuable assistance in their management and government.

He organized the Pennsylvania State Live Stock Sanitary Board in 1895 and was appointed its secretary and State Veterinarian by Governor Hastings and has been reappointed by each succeeding Governor since that time. He commanded the implicit confidence of all his people, from the Governors to the most humble farmers. Few men were better known throughout the Commonwealth than Dr. Pearson and none were more respected. To those interested with him in the Veterinary Department of the University of Pennsylvania, the State Live Stock Sanitary Board and similar organizations with which his work has been so intricately woven, his loss is felt with the keenest sorrow.

He knew how to think, speak and write, was conscientious, far-sighted, honest, possessed good judgment and enjoyed the general esteem of all who knew him. He was a captivating orator, precise, methodical and clear, and possessed to a high degree the gift of analysis, synthesis and generalization. The many abstract and complex problems filtered through his mind as a pure crystal. Speaking or writing, he reflected the exceptional qualities of his beautiful intellect. There was exactness and faithfulness to the rules of our language and a perfect fitness of words to express ideas in every sentence he used. Dr. Jas. G. Rutherford has well said of him, "Dr. Pearson was in a class by himself among the veterinarians of this continent, while even in the Old World there are few who rank anywhere near him. He was not only a great veterinarian but a great man in many other ways, and one who, had he been spared, would have made a well-defined mark on the national life of his own as well as that of other countries." His work has been unique in character from the fact that through his conception most of it has been created. Much of it has been completed, the greater portion planned and years of intelligent application will be required to carry it to a successful fruition. May the same all-wise Providence Who, in His infinite wisdom, has removed this man in the prime of life, direct those who are to take up his many burdens.

Dr. Pearson's illness dates back two years or more when his family and friends became aware of the fact that his manifold duties and responsibilities were telling on him. With his energy already taxed to the utmost, his exhausted condition was greatly aggravated by the additional worry and effort incident to the outbreak of foot-and-mouth disease in Pennsylvania in the early part of the past winter. This, combined with his efforts in securing, from the last Legislature, much-needed appropriations for buildings and maintenance for the Veterinary School and also funds for the administration of the work of the State Live Stock Sanitary Board, called forth the limit of his capacity. With this marvelous amount of work accomplished, it was arranged to relieve him of much of the routine work of his official duties; and, after the narrow escape of his mother and himself from asphyxiation with illuminating gas due to his experiencing a fainting spell while caring for his mother who was at that time ill, he was finally persuaded to take the rest which up to this time he had considered impossible. After recovering sufficiently

from the acute effects of the gas poisoning, he decided upon a sea voyage, a form of recreation to which he was most partial, and accordingly sailed on a coast line steamer for Savannah in the early part of July. On his return, he immediately embarked for England, returning by way of Halifax, where, on the advice of his physicians and friends, he decided to remain for an indefinite period. He was later compelled to go to Newfoundland on account of an attack of hay fever, to which he was subject, and at the time of his death was sojourning at the Log Cabin, Spruce Brook, a secluded place on the southwest shore of Newfoundland. The latest communications received from him indicated that he was improving and that he hoped to be able to return to his office in Philadelphia within a short time. A few hours prior to his death he suffered a sudden collapse which was followed by a hemorrhage that resulted in death in a few minutes. It was gratifying to learn that he had received the best of attention, medical and otherwise, during his stay at the Log Cabin, which was found to be an ideal place for rest and recuperation.

# JOINT MEETING
## OF THE
# Pennsylvania Dairy Union
## AND
# Pennsylvania Live Stock Breeders' Association

## Proceedings of the Dairy Union

### Address of President H. E. VanNorman

On this, the eleventh annual meeting of the Pennsylvania Dairy Union, I am glad to see as many present as are here. There is an opportunity for each of us to get much from this meeting. But it seems as if more interest might be taken in these gatherings by the farmers and creamerymen of this great State. The growth through these years has been slow, but there has been unmistakable growth.

This is hardly a year when we dairymen of Pennsylvania can meet each other with cheerful countenances. The conditions confronting us are not cheerful. The drought and the price of feeds have a tendency to make our dairymen slightly pessimistic.

This is a great State, but where it can spend millions in fostering other industries, and making improvements, it gives nothing comparatively to aid the farmers to put their business on a paying basis. Unless the dairyman is situated where he has a special market, he produces milk at a loss. Someway the notion is current with the consumer and the city press, that the only expense to the farmer in producing milk is to milk his cows and deliver his milk, and if there is any profit it must go to the middleman. It is safe to say that the production of milk costs one-third more now than it did three years ago, and for this reason some of our best dairymen are going out of the business. Something must be done or the American dairyman will be reduced to the condition of the European farmer.

Isn't it possible for us to use our intellects and having determined the actual cost of a quart of good milk to join hands and demand a fair profit for our product when it is placed upon the market? The laws and Board of Health are continually forcing the farmer to take better care and to add to the expense of producing milk, but where is he to be reimbursed for this work if he does produce the extra clean and wholesome milk which the consumer demands?

The dairyman of the East has always bought most of his protein feeds, but it looks as though this condition must gradually change and the eastern farmers must grow upon their own farms the necessary feeds to produce a balanced ration for the dairy cow. It is certainly a problem for the dairymen to consider.

Of the 1,200,000 cows in this State probably seven-eights of them are the common cows, which more than eat their heads off every year, and which are not capable of producing 150 pounds of butter fat a year. If the scientific student of dairy husbandry will aid us in raising the standard of these cows so that the product can be increased by even one-half, we will find the problem of feeding less complex and have a better opportunity for a little profit.

Canada, New York, Minnesota and

many other States have appropriations to send experienced butter-makers around to spend a few days each year at every creamery. These men not only assist the buttermaker to make a better article, and to overcome the difficulties which confront him, but also talk with the patrons, interesting them in bringing the milk and cream in better shape.

This is a matter which needs our attention and which should be discussed here, and which we should continue to discuss until something is done along this line.

As a dairy State, Pennsylvania ranks second. Her dairy products alone were over $40,000,000 last year.

This dairy meeting is ours and we must get from it all we can. The best way will be to be interested in everything, to ask questions, to study the exhibits and to take what we can of practical value for us in our work.

Owing to the noise adjournment was made to the Board of Trade rooms.

# HANDLING STARTERS

## L. H. COOLEY

The subject of "Handling Starters" is, in my opinion, one of the most important features in the manufacture of a good butter, and there seems to be a number of buttermakers yet in this State who do not use a starter, or if they do it is in the form of sour cream or buttermilk.

I have not been very successful in making a good butter with these starters. Now, in handling starters, a number of the boys seem to think that there is some trick in making a good starter.

It isn't the lack of knowledge that causes poor starters usually, but rather the fact that we do not put our knowledge into practice. The easiest way to make a starter does not bring a good starter.

In order to obtain the best results we must propagate our mother starter independently of the large starter can. You, of course, understand that it is absolutely necessary to use sterile milk for these mother starters, and for setting new cultures. But still too many of the boys are tempted to take this milk from the large starter can, after it has been heated of course, but at the same time probably less than 95 per cent. of the bacteria have been killed.

As I have said, the mother starter must be run independently of the larger starter can, and with the utmost care. Most any good glass jar will do to run the mother starter in. There are starter bottles with glass stoppers now on the market, which I think would be a good thing. But I am using the one-quart quick seal glass top fruit jars, which I find very convenient. I use in these jars either a selected whole milk or a good skim milk, for the mother starter.

Now comes the question of sterilizing the contents of these jars. All buttermakers, of course, have their own custom or some particular way to do this work.

My idea is to make a box-shaped vessel, either of galvanized iron or copper, about six inches wide, twenty-four inches long and ten inches deep, which would hold six of the jars that I spoke of. Now solder a piece of short pipe in the end next to the bottom for the steam inlet, then solder a piece of pipe in the other end for an overflow, just low enough so the water will not cover the jars. Place about one inch from the bottom some kind of a slatted screen for the jars to rest on, so they will not set on the bottom of the vessel.

Build a box of wood around this, leaving it an inch or two larger on all sides. This space can be filled with mineral wool or some insulation material. Cover with a good cover, put a hole down through the cover so a thermometer can be inserted into one of the jars which is left uncovered and filled with water, so you can readily see at any time just what temperature you have. Thus the jars can be sterilized in the boiling water any length of time desired.

With this box well insulated, and after sterilization is completed the water can be tempered to the temperature desired, and the temperature maintained for some time. All jars of milk intended for mother starter should be sterilized two days in succession before inoculating. I would have small brass tags numbered 1, 2, 3, 4, and so on, fastened to a small wire snap so they could be easily snapped to the wires on the jars, and could be changed as the jars are used, and you would know at all times just which jars were to be inoculated next.

After cooling to the desired temperature (I would say about 70 or 75 degrees) inoculate with about one-half to one per cent. of the mother starter, and agitate gently by giving the jars a rotary motion. Repeat this agitation occasionally during the first few hours, but not after it begins to coagulate.

When the milk begins to coagulate nicely, set in some cold place until used. Now, I wonder how many of us have a large starter can! I hope the majority have, but I am afraid not. If you have so much the better, but if you haven't you can make a starter in milk cans very successfully; but, of course, it would make much more work and takes a careful person to handle it. In the large can I would sterilize the same as in the mother starters, to 200 degrees; or more and hold at that temperature at least one-half hour, then cool to the temperature desired.

If in winter, when you only separate or receive cream every two days, it would be best to sterilize the starter milk again on the second day, cooling to 70 or 75 degrees, and inoculating with about one or two per cent. of the mother starter; agitate well, and at intervals.

One thing we must watch very carefully, and that is that both the starter and the mother starter do not get overripe. There seems to be only two ways to handle the starter without giving us this trouble:

First—To set the starter about 9 o'clock in the morning, so it will be ripe in the afternoon and can be placed in the cold room. Very few cold rooms are built so as to run a large starter can in, and in such case it can be emptied in some well-sterilized milk cans and set in the cold room.

The second way, and the way that I think most practical, is to set the starter in the afternoon at such a temperature and inoculate with such per cent. of mother starter that it will be ready for use in the morning. I am using 10 to 15 per cent. of starter. I am a great believer in good starters and should I happen to have a poor starter I would rather feed it to the pigs than to try to make a good butter with it.

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The President—This is an interesting topic and we should have some discussion of it. Let us hear from some one and get up a little enthusiasm and discuss this back and forth for a few minutes.

Mr. William Marshall—I would like to ask how to keep tab on the overrun?

Mr. Cooley—The only way you can keep tab on the overrun, is to test your skimmed milk and your buttermilk and take a drip sample of your milk as it comes in, also of your hand separator cream, if you have hand separator cream at all, and then test your butter for moisture, and, of course, if you keep all those tests, then you know how much fat is delivered that morning; then, when you weigh up your butter you know how many pounds you have made and the difference between the amount of fat delivered and the amount of butter made is the amount of overrun in pounds, then, of course, it is a matter of percentage to get the overrun for the day.

Mr. Marshall—It seems to me that it would then be necessary to weigh the cream that you had received each day, would it not?

Mr. Cooley—Yes; if you received any hand separator cream, of course, you must weigh it. If you separate it in the factory take the weight of the milk, test that, that would give you the amount of fat you had received, and if you tested the skimmed milk that would give you the amount of fat you had lost in separating.

Mr. Marshall—One question more I would like to ask the gentleman is, whether he thinks that drip sample would be as accurate a way as if you would weigh your cream that you received during that day, if you would weigh that cream after it was separated and then test that cream, get the percentage of fat that that cream contains, then would you not be able to get at the overrun more accurately than you would by a drip sample?

Mr. Cooley—Mr. President, that would give you the theoretical overrun very well, but the actual and theoretical, of course, are two different things, and when you have tested your cream only you do not know how much fat you have lost in the separation, but you must pay your patrons for it just the same. As I have said, the only way to get the actual overrun is to take this drip sample, because while you may have lost a whole lot of fat in your separator you have got to pay your patrons for it just the same. That would be all right theoretically, but in actual work I think the drip sample would be preferable.

The President—Any more questions?

Mr. Thompkins—Mr. President, a question in the line of moisture is this: In some creameries of the State we have to churn at a very much higher temperature than 52 degrees, which is the ordinary churning temperature of cream. They advise us to use our wash water two degrees higher than the churning temperature. I would like to put the question in this way: Do you believe if churning at 58 degrees we should use 60-degree wash water to incorporate the right amount of moisture, or do you believe in washing with a cooler wash water to bring the butter back to its normal temperature again?

Mr. Cooley—Mr. Thompkins, I do not believe that the temperature of the wash water has as much to do with the incorporation of moisture as other things. While I do not think it is well to go too low on the temperatures, I do not think two degrees lower will hurt the butter any, and yet you will incorporate the moisture just as well if other things were all right.

The President—Are there any other questions? If not, we will take up the next paper.

# OBSERVATIONS

## C. P. VANDYKE, MILAN, PA.

The underlying principles of buttermaking are the same today that they were 25 or 30 years ago, the only change being that methods have been improved upon, the place of manufacture has been transferred from the farm to the creamery, and modern machinery takes the place of that formerly used. The creameryman deals with a composite of many dairies and where the make was computed in pounds then, now we hear of tubs, boxes and carloads.

In those days, while the buttermakers were not theorists nor understood the meaning of technical terms, yet they knew that certain conditions brought about certain results and they were faithful to watch them, and the product they turned out would put to blush many of the buttermakers who have had the benefit of the modern training.

Those who can remember back over that period can recall the dairy room, usually the front basement of the house with its whitewashed walls of stone, flagstone floor, on one side of the room the racks holding the Orange Co. pans, cool spring water running around and under the milk, the place kept scrupulously clean, and everything run as scientifically as the modern plants of today.

The knowledge of buttermaking was the result of observation in daily practice, and they labored unconscious of the myriads of bacteria that swarm on every hand; the term sterilization was not used, yet all utensils were thoroughly scalded and tinware was exposed to the rays of the sun to purify them; terms ripening and acidity were not used or understood. I can remember hearing a leading Jersey breeder of the famous Bovina town laugh an Institute Instructor to ridicule because he spoke of letting cream ripen to a certain degree of acidity.

How many of us today, if placed back 25 years, would measure up to the buttermakers of that time? How much butter made today could be packed in 100-pound firkins, stored in a cellar of moderate temperature and come out six or eight months later, showing as good quality as the butter of that day?

I believe in being optimistic, looking forward, not backward, but what do the market reports teach us? Twelve months in the year the same story is, "Market overstocked with undergrades." We are told that every year the supply of fancy butter is smaller.

This is not a theory, but a cold, stubborn fact, and how much do the buttermakers of Pennsylvania contribute to this state of affairs? Where does this butter come from? Is it wholly a product of the East, or, are we, on account of being near the great markets, getting credit for it, no matter what section of the country it comes from?

I was pleased to see in the program that the buttermakers would have this session by themselves, and it seems to me that the time has arrived when formality should be cast aside and this and similar questions thoroughly threshed out. We have heard it charged that the buttermakers of the East are not progressive, that they are not keeping pace with the advanced practice of the day, in other words, they are behind the times. Is this true? Are the buttermakers to blame for the increase in quantity of butter that is off in quality? Or are these conditions over which the buttermaker has no control, responsible?

I know enough about the buttermakers of Pennsylvania to assert that there are as good buttermakers here as any State can boast of, but there are those who are not a credit to the profession. This last class, of course, is not represented here.

I believe that by these discussions enthusiasm will be aroused, and we will go back to our work benefitted and determined to do better work, and help in raising the quality of Pennsylvania butter.

It is a pretty hard proposition for a lone buttermaker working 12 or 14 hours per day, seven days in the week, to get very enthusiastic, but there are men doing that very thing, and their cheerfulness goes a long ways towards insuring their success. No morose-despairing person will ever be much of a success as a buttermaker, even the minute bacteria that work while we sleep, to develop the delicate flavor and aroma so much desired in butter, must have agreeable surroundings and will not thrive under opposite conditions.

Enthusiasm is contagious. Make a study of your work, master it, believe in it and your enthusiasm will act as a leaven to brighten the condition of some fellow-worker. Did you ever think of the influence the appearance of your creamery has upon those who come in contact with it? Won't the patron who drives up to your door every morning and finds everything spick and span be more painstaking to deliver you a good article than if otherwise? If your tinware is bright and shining, won't he be more likely to keep his in same condition? On the other hand, haven't you been in factories where everything seemed to be going slipshod? The buttermaker making excuses that things are upside down today? Finger marks on the walls that make you think of the Black Hand? Haven't you seen dirt in the corners that was there yesterday and the day before, and if you visit that factory every day in the week the same dirt is there to greet you? True, the creamery must of needs be sloppy certain times in the day, but it doesn't require an experienced eye to discover whether it is wholly today's or is being carried along as a sort of asset. You can't afford to have your place untidy. A great deal has been written about educating the patron to deliver better quality of milk and that the education must come largely through the man at the weigh can. How much argument do you imagine it would require to offset the impressions made by a dirty creamery? What incentive to put forth extra effort to deliver milk in the best possible condition and then see it pumped through filthy pipes at the creamery? Patrons are, as a rule, reasonable. When they see the man at the creamery doing all in his power to have things right they will co-operate with him. The creamery business is not a one-sided affair. The interests of the creamery and patron are identical, and the clearer the understanding is between them the more pleasant and harmonious the relations will be.

For the good of all concerned too many men have charge of factories who should be helpers. No person should be entrusted with the manufacture of butter who has not served an apprenticeship. Too much is at stake, not only the quality of the product, but your own reputation. Wouldn't it be better if the buttermakers could only obtain a license after serving apprenticeship and satisfying the proper authorities that they are competent? The man who is most successful must be of varied qualifications. He must be a machinist, engineer, plumber and above all, a diplomat.

Young men are taking hold of creamery work with little knowledge of what is required; they are disappointed, have no liking for the work and fall into complaining because the work is so confining and the surroundings are unpleasant. True, the work is confining, but the surroundings are largely what he makes them. My observations have been that the man whose heart is in the work, who puts duty before convenience, is the most successful. To such men duty becomes a pleasure.

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The President—Are there any questions?

Mr. Thompkins—The thought was brought forward that butter years ago was of better quality than it is today. We, as buttermakers, certainly believe that the world is moving forward in the line of machinery, morals and other things. I believe this is true then, that the tastes of people are improving, just as much as we consider the butter of today is of a poorer quality than that of years ago. The people years ago were not so particular about the butter as people of today; therefore, there was very little said about it years ago, and today there is a great deal said about it. We have men today doing scoring of butter. Years ago that was practically unknown. Country butter was taken in, they tasted it and if it did not taste of garlic the man passed his opinion that it was all right. I would like to ask the question here today whether that is not the case rather than the proper quality of butter? There are some cases where butter is poorer today. Where we are trying to incorporate into butter so much moisture there is butter put on the market that is poor.

Professor Van Norman—It is my observation that the best meetings and conventions are those where the meeting is made up by the participation on the floor and where we have just enough eminent spellbinders to give you an excuse for getting together. To make the meetings interesting you must get together and discuss these things among yourselves and then you have the best meeting. I have heard it said that the New York State meetings are going backward. Why? Because you have so many spellbinders and little real convention. We are going to avoid that. We have not invited a lot of eminent speakers for this meeting, and if it is not a success it will be your fault. The Convention is going to be a success and because you have not talked in meeting before is no reason why you should not talk today. I hope you people will argue these questions back and forth, because that, really, gentlemen, is what makes a convention a success. I know all of you are modest and do not like to hear your own voices. You have got to overcome that part and help to push things along. The subjects presented so far have material enough to have an hour and a half discussion. Before I see this thing die for want of discussion I will begin to call names. I will call them gently and then try to call them in some other way to get you talking back. I know when some one says something somebody does not believe, and another one defends it we will have a convention worth while. We need a scrap to start this thing up. I hope somebody will do it before I call names. Mr. Van Dyke, Mr. Cooley and Mr. Tompkins, and a whole lot of others whose names I can call, are doing actual, practical work. Let us have discussions here, because in the discussion somebody makes good suggestions that help the other people along.

Mr. Cooley—Let us hear the question just put before the house about this butter, whether the butter is getting poorer or people getting more critical.

Professor Van Norman—I believe there is an element of truth in both of these statements, that the buying public is becoming more critical. I believe some of the butter that was counted the best butter made 10 years ago or 20 years ago, is still the best butter, and I believe some that think they have the best butter today will not stand comparison with that which passes muster in our markets. On the other hand I believe there are some who have gotten tired and the changing conditions have been too many for them and they have not been able to meet them. Now, everything has its ups and downs. A few hundred years ago religion was the only thing talked about. Today our preachers are bemoaning the fact we are forgetting our religion. The pendulum swings back and forth and it may be our butter-making pendulum of enthusiasm has been swinging backward. I believe it will come back again. I do not care how poor the conditions are, we are here to discuss those conditions and see how we can get better butter under our conditions. It has been said that the western man is never satisfied with what he is, but is always trying to get something better. We need that spirit. We Pennsylvanians have grown up in one community and know our own way, and it has been a good way, and we are apt to be satisfied with it. The Western fellow does not know where he grew up—he has no common home. I have already lived in five States and I am not as old as some of the other fellows, but I am not tied down to tradition. The best way we people can get out of this scrape that we are in now is what we want to discuss. Now, then, you fellows, back-woods creamery men, 40 miles from the railroad, if there are any such, and farmers who get rotten cream, is what we are looking after, to know how to bring in cream a little less rotten. I know if you talk these things over here you will get a clue. Because you cannot get a 97 score is no reason why you cannot make it a little better than you are making now. When you make one point "scrap" for the next point. In our scoring work at the college there are about 15 or 18 who are sticking to the end, and it has been gratifying to Mr. Larson and myself to see that butter come in, and to see those who made the poorest butter at first go right along up and getting better. On the other hand, we notice some others who do not seem to be able to make progress, but who seem to be discouraged and quit. We are not going to quit, we are going to keep on. If we have helped two or three to make better butter we feel that we are justified in so using the State's money. In the long run the man who makes the best butter is the man who is surest of the market, if he does not make the extra price. When there is a glut in the market the fellow who makes the best butter is the one that sells. When there is a scarcity of butter the one who makes the best butter gets the highest price. I am not discouraged; I believe we are going to make some improvement yet. To me, one of the most encouraging things in the meeting, is that in spite of the vicissitudes this morning we are able to shift our meeting and go from one hall to the other and pull away from those exhibits a representative gathering like this. If, out of this, will come a discussion and make an interesting and agreeable report, I am sure I have received encouragement enough to keep on in my efforts.

Talking is my long suit, that is what they pay me for at the College, but I do not want to do more than my share at this meeting.

Mr. Marshall—I never got pay for talking and am not able to talk very much, but these meetings are very interesting to me and I like to help them along. Mr. Van Norman spoke about the scoring contest. I have wondered if it would not be more interesting to the ones who are taking part in sending samples to State College to be scored if they were given the number of the scores that had been made. Now, I believe it has been customary to send to those interested their individual scores. We have got no way of knowing whether there is one sample or a dozen, or two dozens samples being sent there. Probably we get some little information from the papers we read, but it seems to me it would help to keep up the interest.

Professor Van Norman—It is a good suggestion. We will be pleased to send scores to them. We assumed they were all reading the papers and getting the benefit of the scores except two or three who were unfortunate in getting a low score, and, of course, they do not want their names published.

Mr. Marshall—I would like to know how he would recover butter fat in the buttermilk after he had churned it.

Mr. Cooley—I do not mean to say we would recover it.

Mr. Detweiler—Does the percentage of the butter fat in the cream have anything to do with the percentage of moisture after it is churned?

Mr. Cooley—Yes; I think it does to a certain degree. Of course other things help to govern the moisture but the percentage of fat in the cream, if you have heavy cream or fairly heavy cream, anything from 25 per cent perhaps up to 35; if you have that cream the butter comes in a different shape, comes in irregular granules and will hold the moisture better, and you could more easily incorporate it in the heavier cream than in the light cream.

Mr. Tompkins—Is it necessary, with a perfectly first-class cream, to wash that butter after churning, or to work the salt out?

Mr. Cooley—A great many creameries wash the butter and some do not. Can they get the butter with as good a flavor that will stand the test after standing several months in storage without washing the butter?

Mr. Van Dyke—My experience has been that it is necessary to wash the butter. I would say, yes, wash butter.

Professor Van Norman—Why?

Mr. Van Dyke—You cannot drain the buttermilk out.

Professor Van Norman—What do you want to get it out for?

Mr. Van Dyke—The nature of buttermilk is to deteriorate.

Mr. Estig—Fifteen years ago I worked with a buttermaker who was opposed to washing butter. He said it washed out the good flavor, but he had to work it twice or three times in order to get the buttermilk out. He would salt it, work it a minute, set it away and the next day bring it out and work it, and the next day work it again until he got clear brine. In that way you make a lot of work but the result was the same, he would have to get the buttermilk out before packing. My experience has been, I can make better butter with less work by washing it. I never wash it but once, and I have good spring water. One washing after churning at the right temperature is sufficient. Mr. Cooley's remarks in regard to the over-run,—I know he did not mention in particular about the temperature of the milk before it was skimmed. I found that before I had a good heater that I could not get an average over-run in the winter, cool weather, when milk was coming to the creamery with ice in it, at a temperature of perhaps 40 degrees. The average heater, such as was on the market then, was not sufficient to heat the butter fat in the milk so that any separator could do thorough separating.

Professor Van Norman—Your loss in over-run, you consider, was due to the loss of fat in the skimmed milk?

Mr. Estig—I do. A great many creameries and buttermakers are handling fat because, perhaps, like myself, they are working in a co-operative creamery. I had a little pipe costing $10 with direct steam running into it, but I finally got a Twentieth Century heater. The agent told me: If you cannot save enough in one year with the milk to pay for that, I leave it to your figures—I will give you the machine. I noticed right there our over-run came up to pretty near where it should be. During the past year, at our annual meeting day before yesterday, our Secretary said, the over-run for a year was 16.67 per cent, but he did not figure on one hundred and a little over of cream or the butter fat in it.

Professor Van Norman—That would reduce the over-run slightly. It would still be over 16 per cent.

Mr. Estig—It was 16 2-3, with that out. About the butter scoring contest, that, I would say, hit me a little. I never entered that. I have watched it; I take the paper, and I know what the score is, although a couple of men from our county scored the highest. I feel proud of them. I think dairymen and creamerymen of Pennsylvania can be proud of Mr. Van Norman's work. We have as good a man as can be at the head and I want to impress it upon all creamerymen and dairymen that they should co-operate more freely with him. The State is willing to help you if you will only ask it. Anybody can know what the scores are if they are up-to-date and reading the papers that they should read.

Mr. Cooley—I would like to ask the gentleman who just spoke if he thought the objectionable matter of buttermilk will be removed by working and then left to stand and work the next day, and so on, until it has all been removed.

Mr. Estig—I say the salt would remove the moisture and you should work again until the buttermilk was worked out and you get the clear brine.

Mr. Cooley—Was it the moisture you wanted to get out?

Mr. Estig—He was a first-class man but he never washed his butter.

Mr. Cooley—What I wanted to get at was, don't you think the casine was the most objectionable? Do you get that out of the butter by working it until the brine is clear?

Mr. Estig—That would be the objectionable part. I will say this, he did not get his butter in very fine granules when he stopped churning. He just turned the butter out and salted it on the table, used an ounce of salt to a pound of butter.

The President—Is not that the old method of 20 years ago; they worked the butter, washed it, then let it stand until the next day, and washed it?

Mr. Estig—I did not agree with him, either. He thought it was the only way, and, of course, I was the helper and had to do as he told me. I never practiced that part of it when I got to running on my own account.

The President—Are there any further questions? If there are none, we will take up the other topic, "Moisture in Pennsylvania Butter," by C. W. Larson, of State College. We will ask Mr. Larson to go over his talk again.

Professor Van Norman—The question was asked before you came in, Mr. Larson, whether it is praticable to get the larger over-run where it is necessary to churn at high temperatures, say at 58 or 60, because of lack of facilities,—under those conditions, must a man still have his wash water the same temperature as his butter, or have it below the temperature of his butter?

Mr. Larson—If he could not cool it otherwise he could put ice into the churn just as the butter breaks. If you have to churn it warm use ice in the churn. This is not the best way, but is necessary sometimes.

Professor Van Norman—Suppose they do not have the ice?

Mr. Larson—If they cannot control conditions enough to have the cream in condition to churn there is something wrong and I know of no remedy for it. If you cannot get the cream cool enough to churn there is nothing to be done, of course. I would not want to chill it down afterwards very much, because if you do, you will get a crumbling body.

Mr. Cooley—Would you still have the wash water above the temperature of your buttermilk in a case like that?

Mr. Larson—No, I do not recommend having it any higher ordinarily than the temperature of the buttermilk as it is drawn off.

Mr. Cooley—Would it not be better to cool it two or three degrees?

Mr. Larson—In summer sometimes it is necessary to do that.

Mr. Stokes—By putting ice in the churn and reducing the temperature of the butter so rapidly, would you not destroy the texture of that butter, not considering the impurities in the ice?

Mr. Larson — We do not ordinarily recommend putting ice in the churn, but this method is better than allowing butter to "break" when so warm.

Mr. Stokes—Does it not break the grain in churning the butter?

Mr. Larson—It does not.

Professor Van Norman—What is necessary that you shall not?

Mr. Larson—You finished the churning and add it to the churn just as it breaks and finish the churning with the ice in. If you put it on the butter after it is already formed you are going to have trouble.

# MOISTURE IN PENNSYLVANIA BUTTER

### By C. W. Larson, State College, Pa.

When I met with you a year ago the question of "Moisture in Butter and Its Relation to Over-run" was discussed. I then made the statement that I believed the Pennsylvania buttermakers were not giving enough attention to the question of over-run and moisture. An 18 per cent over-run, I pointed out, should be obtained as an average for the year, and that the amount of moisture necessary to secure this over-run, if properly incorporated, would not injure the quality, but in most cases improve it. This, in general, was disputed and the statement made that butter with an over-run as high as 18 per cent would be discriminated against by the Pennsylvania consumers on the grounds that it was too wet. I then promised to make a study of the composition of our butter, the creamery methods, and the exact demands of our markets in respect to moisture. I have done so and will first speak of the moisture as I found it from hundreds of analyses of butter from all parts of the State. The average of all the analyses I found to be only about 11 per cent, many below 9 per cent, and a still larger number with less than 10 per cent. I have also analyzed all the butter that has been entered in the bi-monthly educational contests during the year and have some very interesting observations. In the first place, I am gratified to know that only one has exceeded the lawful amount of water, getting about 17 per cent., but this high moisture was only obtained by accident for the maker always before and after that time received a very low test. The average for the year in the contests is about 11.3 per cent. I have compared these averages with corresponding contests in some of the Western States and find that our butter contains from one to two per cent less water. I also collected a number of samples of Pennsylvania butter that was bringing the highest price on the Philadelphia market and found that it contained on an average only 10.57 per cent. The butter made in our State, therefore, we must conclude is low in percentage of water.

I next undertook a study of the relation of the texture and body of the butter to the moisture content. The butter entered in the contests was used for this study. After the butter had been scored by the judge, I placed all the tubs on a table and left them for two hours at room temperature—about 70 degrees. The butter was then examined with a trier, looking particularly to the firmness of the body and the amount of loose moisture present. The most striking fact observed was that only a small percentage of the samples contained over 14 per cent moisture, but of these nearly all were criticised as having either weak body or loose moisture, and in some cases both. At first thought this would lead one to believe that it was not possible to have as much as 14 per cent and still have a good, firm body to the butter, but, looking further we noticed that some were incorporating as much as 14 per cent each day and had butter with excellent body and that was apparently dry. I conclude from this, therefore, that if it is possible for some to obtain this amount of moisture, without injuring the quality, it can be done by others. But it is true, nevertheless, that most of the makers who have sent butter to the contests with high percentage of water do not have the correct methods and do not have the water properly incorporated; and, further, it is not only the butter with high moisture that was so criticised. The very weakest and most slushy butter in the contests was in each case that which tested less than 12 per cent of water. In the December contest, although the average moisture was less than 11.5 per cent, still over 75 per cent of the tubs of butter were cut from one to three points for having weak, overworked body. This is a much higher percentage than we had in the contests during the summer months, and shows that there is something wrong with our methods of churning. We required a record of the making of each tub of butter, and from a study of these, I find that there are as many different methods as there makers. The number of revolutions butter was worked, for instance, was from 8 to 50 revolutions. This, of course, should necessarily be varied some with the different makes of churns. I also find that the wash water is, as a rule, not tempered, but is used as cold as it can be obtained from the well, either winter or summer. This, I believe, accounts for the higher percentage of samples with leaky body during the colder months. I believe that with two changes in our methods a large part of the difficulty with over-worked and leaky butter would be avoided. Firstly, I would temper the wash water to at least as high a temperature as the buttermilk when it is drawn from the churn, especially during this season of the year; and, secondly, I would leave some water in the churn during the salting and working. These two changes, I feel sure, would lessen the danger of injuring the body of the butter, and at the same time the possibility of having the butter mottled would be greatly lessened. From a further study of the Philadelphia market, we find that there are several large makers who are putting butter on the market and selling to the most critical trade and are incorporating at least 14 per cent of water, and butter with this amount properly incorporated when sold on other markets in this State is not objected to. I, therefore, feel that the statement I made a year ago will apply to Pennsylvania as well as any State, that a 14 per cent moisture at this time of the year, especially, would be more satisfactory than a 11, or 12 per cent.

We have hesitated to advocate higher moisture in the Pennsylvania butter because we knew so well the results of the high moisture cries in many of our Western States. It is unknown to many of you, perhaps, but it is true that one of the first and foremost requisites of an applicant for a position in those creameries is his ability to obtain a high moisture and a high over-run. The fruits of this are, of course, obvious. The butter has been overloaded with water and the quality injured. Besides, hundreds of thousands of dollars have been paid as revenue and, in many cases, the creameries have gone into the hands of the receivers through the greed of the maker for an unlawful amount of water. If a little water brings good profits, they say, more will be better, and it is for that reason we have hesitated to advocate the increase of water in Pennsylvania butter. Now, cannot we, buttermakers of the State, go at this in a different manner and be satisfied with a reasonable amount of moisture, but never overlook the quality? I do not advocate a high moisture nor do I think a good grade of butter can be made each day when the high moisture is the foremost thought in the mind of the maker. I do believe, however, that the amount could be increased without in any way injuring the quality, and that the buttermakers in this State must give more attention to this subject and not be satisfied until the standard of over-run is greatly raised. An increase of two per cent,—and this could easily be obtained,—would add each year over $1,000,000 to the dairy wealth of Pennsylvania.

I next wish to speak briefly of the methods of incorporating moisture. A great deal of study has been given this subject, and many experiments have been made by the various agricultural colleges. Every maker who has sought to increase the moisture content of his butter has also studied the various theories, but with all this we do not know just what are the factors which influence the moisture content and why the different methods bring the results that they do. It is certain, however, that we do know enough of the factors and their effect to be able to control the composition of our butter to within the limits of one per cent from day to day. Every maker should make a study of the problem under his own conditions. Three factors I might mention which, if controlled, make it possible to incorporate almost any amount of moisture. These stated

briefly are: The amount of working, the temperatures, and the presence of water during working. There are other important factors but they are mostly included under these mentioned. For instance, the amount in the churn is a very influential factor, but as the amount in the churn is lessened or increased the amount of working is also lessened or increased.

In conclusion, I wish to emphasize the necessity of having some method of testing for moisture if a study is to be made. Do not try to increase your moisture content blindly. We now have on the market two or three tests for moisture that are inexpensive, simple, and are accurate enough for practical use.

Mr. Larson—This covers in brief what I have to say about "Moisture in Butter." If there are any questions I will be glad to answer them.

Mr. Callahan—If you had cream warm enough to make soft butter, would it not be well to add the ice?

Mr. Larson—No, it would take too long to churn, if you put it in the churn. If you see it is going to break too soon and come out soft then I would dump a small amount of cracked ice into the churn.

Mr. Callahan—If your cream was above 65 and you had no other way to get it down?

Mr. Larson—It should not be that high. Is it not possible to cool it with water or any other method before you churn?

Mr. Callahan—Sometimes when the temperature runs up from 60 in the morning to 95 by 10 o'clock?

Mr. Larson—It should be cooled down lower than that.

Mr. Harrington—What moisture test do you think is the most practical?

Mr. Larson—We have three tests on the market that are very satisfactory, I believe, for practical use for creamery purposes, the Irish test, if used rightly, will give you fairly accurate results, accurate enough for all practical use; but it is absolutely necessary that you study the "end point," the time to stop your heating. In the first place you must not have too hot a flame and must watch your beaker, watch it as it is foaming and stop it as it stops foaming the first time.

Professor Van Norman—For the benefit of those who do not know the test by name describe what the Irish test is?

Mr. Larson—The Irish moisture test outfit is simply an aluminum cup, an alcohol lamp and a set of weights. Ten grammes of butter are used. The butter is placed in this little cup and is heated slowly for a short time, until all the moisture is driven off. The end point is at the time the moisture is off. The butter will foam up and just as it foams up and goes down I find is the right time to stop, and if you stop at that time it will be very near the official test. The paraffine method, as it has been modified now by the government, is giving very good satisfaction. There is less danger of overheating in this method, because it is the same principle as the Irish except that the cup fits in a pot of paraffine which remains at a constant temperature, and there is no danger of heating it too high.

The Farrington high-pressure oven, which is a little oven fitted up on the steam line of your boiler, is also very good. It is more expensive than the others and takes more time to make a test, but the results are good. Gray's moisture test I have not been able to get good results with; there are too many chances of error.

The President—You consider the Irish test the most practical of any on the market?

Mr. Larson—No, I do not think it is any more practical than the paraffine method. It is the same principle, only the danger of overheating is overcome by the paraffine method.

Mr. Van Dyke—Do you think the butter can be heated too rapidly?

Mr. Larson—Yes, in butter-fat there is eight per cent of volatile fat and if you heat it too rapidly there is a chance of some of it being driven off and you will not get a right test. If you heat it too long and get it browned or black the test will be too high.

Mr. Mott—I would like to ask you what is the difference in the time consumed in the Farrington, or Gray's, or these other tests; which is the most simplified for buttermakers' everyday use?

Mr. Larson—A high-pressure oven of course takes a shorter or longer time, depending upon the amount of pressure. For instance, if you have 75 to 80 pounds pressure on the oven, the boiling point will be increased to 260 degrees up at State College, in the mountains, and for that reason the higher pressure you have the higher temperature. At that pressure, about 20 minutes in the oven, while with the Irish test or a paraffine test you run a test in two or three minutes. But if you do not need these tests right away, if you are going to finish the churning, all you have to do is to weigh out the sample and put in the oven and go on with the other work. Not many buttermakers ever make a practice of testing their moisture in the butter before they take it from the churn. Of course in that case the time would be a disadvantage with the high-pressure oven.

Mr. Marshall—I would like to ask Mr. Larson what is the remedy for leaky butter?

Mr. Larson—I think leaky butter is some cases would be largely overcome by regulation of the temperature of washing.

Professor Van Norman—How?

Mr. Larson—If you put in your cold water and churn you have chilled it down and that water is not going to work out of it and you are going to have leaky butter, and I believe most of the samples that were criticised were found afterwards had been washed at cold temperature.

Mr. Marshall—What temperature would you recommend for the ripening of the cream?

Mr. Larson—The ripening depends entirely on the length of time you have to ripen. I believe in churning as quickly as possible and if you can churn the same day the milk was taken from the cow it is better. Of course the higher the temperature the quicker it will ripen. About 65 or 70 degrees, if you have a starter gives the best results, 60 to 70. We ripen about 65 usually.

Mr. Tompkins—What are the causes of butter having a fishy flavor?

Mr. Larson—I cannot answer that question. The government has been working for two years on a study of fishy and metallic flavors and they are not able to tell us anything yet. I cannot answer that question.

Mr. Harrington—What is the cause of tallowy flavor?

Mr. Larson—Tallowy flavor comes with tallowy body, in many cases, and the tallowy body may be obtained by the milk itself or by the cream being of that nature; but it is more apt to be due to the cold working and washing. Tallowy butter is usually due to the latter.

Mr. Harrington—Do you think it comes from overheated cream as a rule?

Mr. Larson—No, I believe not. What do you call overheated?

Mr. Harrington—When it comes into the creamery at 75 to 80.

Mr. Larson—Cream that comes in or the milk?

Mr. Harrington—Cream.

Mr. Larson—It may have something to do with the flavor, but it would not necessarily produce the tallowy flavor.

Mr. ............ You spoke about churning the same day. Suppose you do not get through until 12 or 1 o'colck, would it be possible to churn that same day?

Mr. Larsen.—Yes. The day would be long but I have done it many times; skimmed from six to one and churned it that same evening. Run it into the ripener and put your starter in and ripen it up and churn it late in the afternoon.

Professor Van Norman—For what reason, advantage or gain?

Mr. Larson—The gain is largely in quality of butter. That is the main thing. The quicker you churn it the better, because the butter keeps better than the cream in any case.

Mr. ................ Can you get as good a body as you could if you held it until the next day?

Mr. Larson—You can if you chill it properly before churning, but it must be cooled before churning.

Mr. Cooley—I would like to ask if this tallowy flavor from overheating on the road, that Mr. Harrington speaks of, could be restored by the use of a good starter.

Mr. Larson—It cannot be restored; it can be improved by a starter.

Professor Van Norman—You are refering to hand-separator cream?

Mr. Larson—It can be improved; it cannot be made as good as it was before.

Mr. Harrington—How long should it be left standing before churning?

Mr. Larson—If you have a large amount of good starter and the milk came in fairly ripe, or the cream, of course you could ripen it up in a short time. It does not make any difference about the time, just so you get the right acidity at the time.

Mr. Larson — Hand-separator cream ought to be ripened together.

Mr. Harrington—How long?

Mr. Larson—A few hours is enough. It will all get the same acidity in that time. In churning some sweet and some sour cream the riper would churn perhaps a little sooner, there would be a greater loss in the buttermilk. A few hours is enough. It would not be necessary to keep it 12 hours if we have a good starter.

Professor Van Norman—Mr. President, I just wanted to say to those who do not know Professor Dean, of Canada, that he is a very practical and well-equipped student of the butter making business. Canada is doing some splendid work and I believe that you will all be interested in hearing this this afternoon.

This subject of starters is one that I have been very much interested in. It is one of the most live questions in Pennsylvania creamery business today, and we have three men on the program to discuss it; a number of you here will have some questions and something to say. I believe that our afternoon meeting will be still more interesting than our morning meeting has been.

I hope every man that is not an exhibitor of butter will not fail to hand in his membership so that these reports can be sent to you when published. The last report is out and I hope has reached all of you. We have sent out nearly 3,000 copies. The stenographer is getting down the discussions this morning and it will be reported in the proeedings of the meeting.

The Treasurer is here and he will be glad to receive your subscriptions and give you the badge and a receipt. We will come back here at 1:30 and will have the afternoon.

Adjourned until 1:30 o'clock P. M.

## AFTERNOON SESSION

Board of Trade Rooms.
Harrisburg, Pa., Jan. 27, 1909.

The meeting was called to order by the President at 1:30 o'clock p. m.

The President—If you have any questions we would like to have a few minutes' discussion before we start up the afternoon program.

Mr. Calahan—Why is it the butter of Minnesota scores up 100 points, while Pennsylvania is down to about 90?

The President—Mr. Van Dyke has been visiting the western creameries, see if he has an answer for that.

Mr. Van Dyke—Because the quality is better

Professor Van Norman—What makes the quality better?

Mr. Van Dyke—Well, I have visited a good many of the best creameries in Wisconsin and Minnesota and Iowa and I find greater care is taken in the manufacture of butter there than in the average creamery of at East. You go into a western creamery and you have got to talk about butter and butter making as long as you stay there, it seems to be on their mind. They are invested with the idea that each man wants to be the best man. They take pride in the manufacture, they study into the details and I believe there is greater care used, and I

believe there is a better feeling between the creamery men and the patron than there is in the east. The creamery man studies to please them and give them value received, and I believe that that is the cause of better butter and that they get better milk than in the home creamery and they use greater care in the manufacturing.

Professor Van Norman—How are we going to bring about those conditions in this state, Mr. Van Dyke?

Mr. Van Dyke—I believe, confidentially, that the greatest thing to bring that about would be state inspection.

At the time of butter scoring I saw perhaps 100 samples of butter scored. When it was very poor, some was very poor, they had a representative go and visit that creamery and help them out of their difficulty. I believe that is what we need in Pennsylvania more than anything else today, State inspection, some one capable of going to explain difficulties where they are putting out the product.

Professor Van Norman—How are we going to get it?

Mr. Van Dyke—I don't know. I am not a politician.

The President—Haven't we any politicians here? Are there any remarks along this line? Has any one got any other question they want to bring up? If they have, let us hear from them.

Mr. Fielden—Do you not think there is something back of the creameries at a place where the milk is produced that ought to be looked after just as much as the creamery that takes clean milk, and that has something to do with it?

The President—How would you remedy that?

Mr. Fielden—In simply that way, have somebody go around and see the creameries.

The President—Have the State do it, or the creamery?

Mr. Fielden—The State, I should say. The State Board of Health of Massachusetts for the last two years has had an inspector out all the time, and it has helped conditions around the dairy farms so that the city of Boston gets very much cleaner milk. If the same thing existed here probably they would get cleaner milk at the creameries whether they are as liberal in their appropriations here or not, I do not know.

Professor Van Norman—The same is true of New York City.

The President—We would like right here to bring up a discussion on that subject with regard to the State furnishing experienced men to go around and visit creameries and dairies in this State and how it can be brought about and the best methods to do it. We would like to have a discussion along those lines and I would like to have you start this up. Mr. Kimble, you start this ball rolling.

Mr. Kimble—Mr. Chairman, I hardly think that there is a creamery man here that would not recognize the good work that has been done by Mr. Van Norman since he has come from the west to our midst. I think he has sown the seed of a great deal of good for the creameries of this State, and I believe that one of the features of creamery work in the State is its lack of uniformity and lack of adherence to the general principles of creamery management that keeps us behind the times. Anybody that travels through the west and goes through the creameries there has met with conditions which we do not realize in this part of the country. The buttermaker in Pennsylvania has to be very careful in the handling of his patrons. As a consequence he receives milk and cream which he otherwise should not do. The buttermakers of the west have gotten around that by having a series of State inspection, not only in creameries but for the daries. They go to creameries and the buttermaker of the west, the moment any cream or milk is offered to him that is not strictly up to the standard, he puts himself in the position, if he buys it, of becoming a criminal under the law, and a patron cannot ask him to buy it. The violator of the law in bringing milk or cream to the creamery is promptly reported to the State authorities and somebody goes to see him to find out what the trouble is. I think it would be a most excellent thing in Pennsylvania, if, under the direction of some competent authority, we could have a system of inspection of our creameries and of creamery work that would be practically secondary to the government inspection which is now going on all over the country. Mr. White, who has charge of the creamery inspection of the United States government, has done a great work all over this country. That work can be well supplemented by the different States themselves and it would seem that the time is ripe for some effort on the part of the creamery men in this State to obtain from the State authorities the right and privilege of having some attention paid to their industry. Now, the dairymen of the State and the creamerymen of the State have some recognition of the importance of their work. They should not get behind the times, but should be fully equal to all privileges that their brothers in the west have. Now, it would seem as though the Pennsylvania State Dairy Union should start the movement to have some State aid in inspecting—well, inspection is a bad word, we do not like the word inspection hardly, a good many of us do not,—but the assistance of the State to provide conditions which will remove any poor condition in the creamery or dairy and with the present agitation in the pure food line and in the handling and care of milk going on before this Legislature, it would seem that some efforts should be made towards having under proper direction and control an instructor or assistant to the creamery men in the manufacture of their products. I believe it is wise for the Pennsylvania State Dairy Union to take this question up and, if necessary, have a committee to see what can be done to have an appropriation or law of some kind passed that would bring about the desired results. Probably Professor Van Norman could help very largely in this respect, his experience in other States giving him the ways and means of doing these things, but it should start with a body and organization of creamery men such as we have here. I am glad this matter has been brought up, because it is something that is progressive and something that we need.

The President—Mr. Marshall, I heartily approve of the gentleman's idea.

The President—Any of the others anything to say along this line?

Mr. Gheenan—I think this gentleman is on the right track, exactly. I have taken this matter up that he has just spoken of with several of our representatives and asked them if they would not use their best endeavors to have an appropriation made that good, intelligent men might be put on the road to circulate among our dairymen, to elevate the cause and further the interests of the farmer in that particular. Not necessarily force him or drive him out of business, but to elevate the business.

I did not expect to say anything, but I have been talking this thing up all forenoon and I thought this would give me an opportunity. If each gentleman will take it up with his representative, wherever he is from, every man interested here in the dairy business will take it up with his representative, you will get an appropriation, and I think the time is ripe for it and every man ought to take hold of it.

Professor Van Norman—I would like to state a word or two possibly in connection with this work. We have a representative here from Ontario who can tell us a little about the work over there. I happened to know that they employ a large number of traveling instructors; Michigan has some, Wisconsin has a number. Minnesota was referred to awhile ago; I know that they have some 16 men who do nothing but visit creameries. They go, not as policemen, but instructors to help those buttermakers, farmers and patrons of those creameries to produce better milk and butter. I believe that we need to put emphasis on the instruction side of this work. We were instrumental, some of you may know, two years ago, in having a bill introduced in the Legislature, providing for inspection, and it was knocked out on the ground that farmers and milk producers did not want police regulations, but instruction how to do those things better. I believe that the thing for our association to do is to push this thing along the instruction side. We have in this State every class of dairying in the United States that is of any importance. We have immense retail markets, a milk shipping business, certified milk, milk dealer and great distributing companies. We have the farm buttermaker, an immense number of them, who sell butter to a retail trade, milking from 10, 30 or 40 cows and delivering that butter within driving distance from where it is made. We have a large number of creameries making butter and selling it direct to the consumer or distributor; this does not go through the hands of so-called middlemen, a condition unlike the west. We have an immense ice cream trade, a growing trade. We have cheese factories, not in large numbers, but we have them. Now it is a gigantic industry with its many branches.

In St. Louis I was at the Exposition four months, and saw all the butter scored. Minnesota buttermakers took from two to three out of the highest five scores every month. Why? Notwithstanding the fact that their entries were something over 300, the average for their 300 was usually higher from month to month than the 10 or 15 from New York, or 10 or 20 from Michigan, or some other small number. When you increase the number you increase the difficulty of getting a high average. Yet, with the large number, they got the high averages. Why? Because their men were educated in the art and science of the buttermaking business, and to me that is one of the best arguments for education, and especially practical education.

It is a fact that the same butter that scores highest at those conventions is the butter that our Philadelphia commission men, New York and Boston commission men are all looking for. The open market fixes the standard of quality in our markets today. The butter that the commission men buy by the thousands of pounds and are willing to pay the price for fixes the standard. It is not what Mrs. Jones, living off on the back street buying a pound of butter, wants. She may know or not know; she may be satisfied with anything. But the man who is in the business and his whole business depends on supplying the kind of butter his hundreds of customers want, that is what fixes our market requirements when we use the term "market requirements."

In this State you have a large number of buttermakers, whose butter never goes into the markets because the grocer takes the butter and pays him market price for it. He thinks he is making as good butter as can be made and yet when he sends the butter to the convention and gets a low score, to use college slang, he is sore. He says, "I can get a cent above 'nearby print' quotations and yet you fellows give us a score of only 90." It is simply because his trade is accustomed to his peculiar butter and likes it, and they are willing to pay him for it. Now, they like the good butter just as well.

If this association does something, I think it should be along the educational line, and it should be in such shape as to benefit the creamery men, the buttermaker, the cheese factory man, the shipping station and the great bulk of our milk producers; and it should be along the line of educational work.

Some States provide for police and educational work. I believe the police side of the work in this State can be taken care of by existing agencies. It is not the police side we need primarily, it is the educational side, and I would like to see this association take the initiative in a movement of that kind, if they see fit.

My judgment as to how it should be done is that you should appoint a committee and let them work it up. But, gentlemen, this will not be done until enough of you want it done and are willing to go into your pockets and support whatever the association or the committee does, and pay the expenses of somebody to look after the proposition. It

may mean $100, or $200 or $300 to send that committee down and get a bill in, and look after it and see that it comes up, is properly drawn, and worked up. All those things have got to be thought of and it will not go until you are in earnest enough to do that kind of work. If there were 20 creameries in the State of Pennsylvania willing to put in $10, and individuals to make up the difference, I have no doubt that that thing could be pushed through. Whenever you people are ready to say that you will do that, you will get it. It cannot be done by me or the college asking for it, because we are already asking for more than we will get for our work at the college, but what do you want for your work away from the college?

The President—Are there any others that have anything to say along this line? Let us hear from Professor Dean. What are you doing in your instruction work over there, please?

Professor Dean—We employ about 35 traveling instructors. Of course we make much more cheese than butter in our province, consequently we have only some four or five creamery instructors, the others are instructors for cheesemakers. Now, the prime object of the work of these men is to give instructions, not to act as policemen. I think Professor Van Norman was quite right in emphasizing that phase of the question. In America, and I use that in the wide sense, they think that every man has a right to do just about as he likes, and if you interfere with that inborn right, which every American and every Canadian feels is his, you are apt to push the feathers the wrong way and there will be trouble in the family. Therefore, I think if you were to go to your Legislature,—and judging from what I saw up at your Legislative building, you must have money to burn in this State—if you were to go to your Legislature in the right spirit, backed by the sentiment of the people, which you have here, there ought to be no trouble at all in getting sufficient funds to pay the number of men that would be required to do that work properly. I do not know what it would cost here. It costs us on an average of $1,000 per man. If you would put eight or ten men on the road (I do not know your conditions) that would give you an idea as to how much money would be required.

Now, we have men who do police work. That is, if a farmer tampers with the milk or the creamery man or factory man has an unsanitary place, we have men that act as prosecutors under those conditions, but the regular instructors do not, as a rule, take up that line of work, and I think that the educational side of the dairy question needs emphasis in nearly every way and that is something that the people are willing to pay for. It is surprising how the people of nearly all the States will pay more for education, if it is properly put before them, because they realize education is the great factor in developing the people of the country and its resources.

Therefore, I would say, that our experience has been that the State instructors can do a work which cannot be done by an agricultural college or any of its men at the college, and if you have none of these traveling instructors in your State at the present time, from our own experience, I think you could not spend money more wisely than by having some good men go out among the creamery men and farmers and help them out of difficulty and be a real educational factor in this country.

The President—Is there anything else along this line. We would be glad to entertain a motion if you think a committee should be appointed.

Mr. Knoll—I make a motion that you appoint a committee to take this matter up and to report.

Mr. Gheehan—I will second it.

The President—Have you anything to say in regard to the number of that committee?

Mr. Knoll—I think that ought to be left to the President, as many as he sees fit.

The President—Are you ready for the question?

(The question being put the motion was unanimously agreed to.)

Professor Van Norman—Mr. President, as the Secretary of this Association, I would like to add, that this means business if you want to carry this thing through, and I would like to see the stenographer get the names and addresses of every man who is willing to contribute a little something to the support of that committee. If they are going to do work at all it will mean correspondence, and it will mean somebody going to Harrisburg and a little hotel bill occasionally, and you people who are going to get the benefit of this should supply something to foot the bills. I don't know anybody that is going to do it except yourselves, and if these men give of their time to help push this thing through and take the brunt of the fight, the rest ought to help support it. I think it would not be out of place for those of you, who are willing, to say, "We are willing to help this thing along with our dollars." Then the President has something to go before the committee with if there are 10 or 15. Then your committee has a basis to work on. You can easily enlarge that circle if you have that many to start with.

Mr. ..........I think it would be a good idea to find out how many creamery men are here to take hold of it.

Mr. Sharpless—I very much approve of these remarks. A few years ago, I may say, this Association was the birth place of the present oleomargarine law, and some of us worked pretty hard on that question until we got this law passed and we all know what a good effect it had. The committee came to Harrisburg and lobbied, one thing and another, and it was pretty expensive. I approve of the committee being appointed to work on this matter, and I think their expenses ought to be met, a portion, at least.

Mr. Mott—I would like to ask how many creameries are in the State; do you know?

Professor Van Norman—It is pretty hard to tell. We have a list of some 1,100 or 1,200, but somebody tells me every now and then, that the list is not right. In spite of my invitation to tell me where it is not right, they do not send in a list and say, "this one is dead and that one," and help to correct it. It is easy to tear down but hard to build up by giving me information. I think there are 700 or 800 creameries in this State. Many of them are shipping milk that have been formerly classed as creameries. The butter industry in this State is not growing and is not going to grow for a good while, but the milk producing side of it is not getting any less; other branches are growing. I would like to see the hands of as many creamery men as are here that believe in this thing, to the extent of putting something into it, to make it go.

Mr. ............... What constitutes a creamery?

Professor Van Norman—The technical definition of creamery is where the milk of two, three, or more herds brought together for the manufacture of butter. If it is the milk from one herd, even though it may be a good deal bigger than the creamery supply, it would count as dairy butter.

I think this movement should not be limited. I say, creamerymen, because we are primarily a creamery meeting. Tomorrow we have the milk producers of the State in co-operation with the Live Stock Breeders, and I think we are simply taking the initiative today and the other side will follow. There are at least 15 or 20, perhaps we had better call names, then this committee will know whom it is to call on.

Mr. Mott—The reason why I asked Professor Van Norman the number of creameries,—of course there are a few buttermakers who would like to give something, some more generous than others. Usually a buttermaker has some influence over the proprietors of the creamery. This is a matter that will come before creamery owners, and it will be for their benefit and there is not one of us but would be able to draw a few dollars out of the Creamery Association. For instance, if we should subscribe as buttermakers and cannot draw it out of the creamery company we will pay it ourselves. It may be possible to make up quite a little sum to help this thing along.

Professor Van Nroman—My idea is buttermakers are not to finance this proposition. It is the creamery's business. The proprietors of the creameries, whether individuals, companies or co-operative assoications. There are a good many managers here, I suppose 20 of them. This committee can be appointed and get busy right off. Here are 10, 15, or 20 men, say we have a dollar a piece to begin this work. Then the committee will have something to send a letter to all the creameries in the State and invite their co-operation, both financially and through their legislators? If the number that are here make that beginning then the committee has got something to work on. If you do not and you wish to go before them you have nothing to begin with.

Mr. ............. How much ought this committee to have in hand to get busy?

Professor Van Norman—If they had $50 or $75 in sight that would carry the thing to the point, it seems to me, of knowing what they are going to do and to submit plans to the State at large.

Mr. Kimball—Why not start a subscription now. The company I represent subscribes $10. If necessary to give more, we will give more.

Professor Van Norman—Then, I suggest, Mr. President, that, as Secretary, I take the names of those who wish to subscribe to the fund.

The following subscriptions were received:

| | |
|---|---|
| Pennsylvania Creamery Company, (and more, if needed) | $10 00 |
| S. T. Edels Sons (paid) | 5 00 |
| Moffat Wentworth (paid) | 5 00 |
| Walker Ice Cream Company | 5 00 |
| Niagara Creamery Company | 5 00 |
| Farmers' Elbrook Creamery Co | 5 00 |
| New Berlin Creamery Co. ((paid) | 5 00 |
| Hartford Dairy Co (paid) | 5 00 |
| D. R. Stevens Dairy Co. (paid) | 10 00 |
| Spring Brook Creamery Co. (paid) | 5 00 |
| W. T. Marshall (paid) | 5 00 |
| O. D. Mott | 5 00 |
| A. Y. Detweiler | 5 00 |

Professor Van Norman—It is not limited to these amounts. If you want to pay more, or less, it will all help along. We have a record here, if this thing does not pan out we will declare a dividend and reimburse the people in proportion to their contribution.

| | |
|---|---|
| E. W. Estus | $ 5 00 |
| J. S. Harrington | 5 00 |
| H. M. Stokes (paid) | 2 00 |

Professor Van Norman—This will give your committee something to work on and report.

To the late comers we will say we have had a money-raising bee; we are trying to get some money to get an educational bill started for some traveling instructors. If you want to get into the game come on.

## Additional Subscriptions

| | |
|---|---|
| D. H. Meyers (paid) | $ 2 00 |
| A. H. Mathews (paid) | 2 00 |
| F. P. Knoll | 2 00 |
| B. F. Gabler (paid) | 2 00 |
| C. P. Van Dyke | 2 00 |

The President—If there are no others we will take up the program. The first topic is "Factory Butter Making.'

(Mr. M. E. Reeder in the chair.)

The President—Gentlemen, we are open for discussion of this important subject. Any questions will now be heard.

Mr. Knoll—I would like to ask Professor Dean whether he recommends cream without a starter, or with starter.

Professor Dean—I have used both plans. My own preference is without a starter; pasteurize the cream, run it over the cooler directly into the churn and churn as soon as possible. Without the starter I think we make the finest flavor. Some say, "will that butter keep." We find that butter keeps better than butter made from cream in the ordinary way. But you must have the conditions right before you can make that kind of butter. In the average cream you cannot make that kind of butter. Why? Because you cannot get cream delivered in good condition. You must have control over the cream from the time it comes from the milk and where you can do that I believe you can make the very finest kind of butter.

The President—Any further questions?

Mr. Wivel—Do you get as good results with that kind of cream?

Professor Dean—You mean as to chilling?

Mr. Wivel—Yes.

. Professor Dean—Usually we do, although occasionally we have excessive loss of fat in the buttermilk and we are not able to explain why that should occur. If we have our cream properly cooled and have it a little on the thin side. If we get it cooled down to a temperature of 48 degrees, then we get exhaustive churning. There is that danger you have mentioned, of a high loss of fat in buttermilk. With proper conditions you will get as exhaustive churning as you will where you ripen the cream .

Mr. Marshall—About the keeping part, I don't know whether you mentioned that or not. Does it keep as well as where the cream was not ripened?

Professor Dean—Better.

Professor Van Norman—Better in what way?

Professor Dean—Butter made out of some cream partly ripened and partly sweet, the butter made from the cream churned sweet will hold its flavor better at the end of three months than butter made from the same cream ripened in the usual way. You will understand that in the ripening process, as carried on in the average creamery, as you may have observed, your cream and your milk are more or less exposed in vats, and I have never yet seen the cream that you could not detect the effect of that exposure, and it comes from the bacteria. Those will get into the cream in spite of anything you may do. The more quickly you can churn the cream after it comes from the cow, our experience is, the finer is the flavor of the butter and the better keeping quality and the longer you hold the cream for any purpose whatever, the greater risk you are running of maknig a butter not so good in flavor and lacking what you call keeping quality.

Mr. Thompkins—Do you consider that would be a safe way of doing in many creameries, having no pasteurizer, to churn a cream unpasteurized?

Professor Dean—No, you must follow pasteurization. Where that method is followed you could not do that. Where you take raw cream, unless you had a perfect quality of cream, which is, of course, practically impossible in the creamery. Pasteurization is essential in that method.

The President—Any further questions? It seems to me this is a very important question, "Factory Butter Making," and we ought to learn all we can. We will be glad to hear any further questions.

"Handling Starter." a symporium first by O. D. Mott, Edinburg.

Mr. Mott—We are to have two more papers, and as we are to have a discussion afterwards, I will make this as brief as possible. It is not just exactly the proper subject after listening to Professor Dean, because I am quite a believer in starters myself and he is trying to tell us how to make it without starters, although we will try to have a little discussion. I think half an hour of good hot discussion is better than two or three hours of my standing here talking.

Professor Dean—Lest I should create a false impression I would like to say I would not have you think I do not believe in starters. I certainly believe in them with the conditions under which you work in the average creamery. I am talking about ideal creameries where you have the cream delivered and have complete control of the cream. For the last few years we have been compelled to operate the creamery by gathering the cream and since then we have had to follow the plan our friend has outlined. I would like to correct that impression if I gave you the impression that I do not believe in starters.

Mr. Mott—I was just joking Mr. Dean.

The President—As we have two others to follow on the same subject we will defer the discussion until we have heard from them.

Mr. James Dean, of Towanda—He does not seem to be present. Gentlemen, I have the pleasure of introducing Mr. E. E. Wivel.

Mr. Wivel—For my part I am in favor of using commercial cultures, I am sorry to say I do not use it, never have used it since I left school. I am working for a company that does not have starter and does not believe in cultures, and I would not feel disposed to invest in it myself, so we try to make the best of our conditions and get along without it. When I first went there they were using sour cream and I did for awhile until I changed to the buttermilk. I have had better results because I can detect faults quicker than I could in the cream. This time of the year we are only churning four times a week and I am having a good deal of trouble to keep it in good condition. Sometimes I get some of the best whole milk that I can, and allow that to ferment and use that until I get it back again to where I want it, but altogether it is not very satisfactory to me. I would rather use commercial culture. As I understood this question, Professor Van Norman wanted to know how we handled the starters ourselves. That is what I am trying to tell. When he first asked me about this I supposed I could easily get out of that by saying I did not use any. I knew very well that he knew that and he wanted to know how I did it. I let it sour in the natural way and it produces very good butter then. Some of our head men were buttermakers themselves, dairy buttermakers, and produced a good article and they had control of the product from the time the feed was put into the cow until it was butter. We are getting milk that I do not think any starter would make good. Right along that line I think I would be at the same time very much in favor of an inspector.

The President—The discussion about handling starters is open for any questions that may be put to the speakers in regard to the starter business.

Mr. Marshall—I would like to ask Mr. Mott what culture he uses, and whether in the liquid or powder form?

Mr. Mott—I guess I have used all kinds.

That is, I ran an experiment of my own. Occasionally I used the liquid starter this winter, although I do not think there is any particular difference in them. The liquid starter we cannot keep as long. If you want to get a lot at a time and keep it, it is better to use the powdered form but it takes longer to get started, nearly twice as long as liquid. For our home starters I select milk; I have often taken a dozen cans, the best milk I could get from our patrons, and set them away and take my starter from those dozen cans. I have also gone out among the farmers and milked the cows myself in order to get milk for starter, in a steralized bucket. With a sponge I have washed the flanks so as to keep out as many bacteria as possible. I have done that with very good success. At the same time I have done it in that way and it made a bad starter. You have got to set a few starters and take the best. That is the hardest way, of course, to get them. If you want to take it easy get the commercial cultures, though sometimes I have had as good results with skim milk as I have had with commercial starters, but you must be very careful.

Mr. Thompkins—Several of the speakers this afternoon have spoken of using different materials for their starters. One has spoken of using cream, one buttermilk, one skim-milk. Now, which of these is the one which will give us the best satisfaction and the one that will give us the smallest loss in the buttermilk? We, in the creamery where I am working, are using Cornn Culture, B 41. That gives us good satisfaction, as we set our starter every two days. We use whole milk and it seems to me, from testing and examination as near as we can find, that we have greater loss of butter fat in the buttermilk than is necessary when we use the skim milk. In the northern creameries through Bradford, Tioga and Lycoming, creameries that I have been in, I find several of them using skim milk, some using buttermilk and some no starter at all. The creameries in Dauphin county are using skim milk and whole milk. One man I know of, who has made the highest score at several of the county fairs, and I believe at one time made one of the highest scores at the Dairy Union, had used no starter at all, barring only the natural starter which he has made himself of whole milk. Which is the best mateiral to use for starter, whole milk or cream?

Mr. Mott—Does he mean that for me? Better get Mr. Wivel into some of these discussions. In regard to the buttermilk or cream starters? A very fine flavored sour cream would make a good starter. The same way with buttermilk, but the flavor must be fine in order to make a good starter; where the skim milk starter is not of fine flavor, it does not make a good starter. That is about the way I look at the cream and buttermilk starter. If you are using a buttermilk starter, buttermilk churned this morning for tomorrow's starter, we will put that into the cream tomorrow morning. So we are inoculating the new with the old, and it is getting worse. I would not want to keep it that long. That is the reason why I mentioned the commercial starter.

The reason why you lose so much fat in the buttermilk would be because of the butter fat in the whole milk. If it was not for the loss of butter fat you probably could get a nicer starter by selecting from the fresh morning milk from some farmers than you could by using skim milk.

The President—Mr. Wivel, what is your opinion about this?

Mr. Wivel—I cannot see what difference the starter would have on the churning of the cream unless it would be as Mr. Mott has said, using the whole milk.

Professor Van Norman—What do you use for starter?

Mr. Wivel—I have sort of make shift. I use buttermilk, cream, whole milk, whatever I think is the best.

The President—Are there any further questions as to handling of starters?

Mr. Marshall—I would like to ask one of these gentlemen about what per cent of butter fat should be in buttermilk? What is the general experience?

The President—Mr. Wivel, what is your experience?

Mr. Wivel—The churn manufacturers state how much is to be allowed in the buttermilk for their particular churn. I have never been able to get quite as low as they claim. I generally run three to five-hundredth per cent, sometimes I run over that.

The President—Mr. Mott, what is your experience as to the amount of fat retained in the buttermilk?

Mr. Mott—I did not hear what Mr. Wivel said, it might make a difference in my answer. I should think from four to five-tenths of one per cent would be the result.

Professor Van Norman—He said four or five hundredths, you say four or five-tenths?

Mr. Mott—I may use a different term.

Professor Van Norman—Mr. Cooley, what is yours?

Mr. Cooley—I think two to four-tenths.

Professor Van Norman—Mr. Van Dyke, what is your experience?

Mr. Van Dyke—Five one hundredths to one-tenth.

Mr. Knoll—I do not think that any buttermilk ought to test more that two-tenths. That ought to be the very outside limit unless you get very poor cream that has been pasteurized at high temperature. I do not think it is permissible to get higher than two-tenths. Ordinarily you ought to churn from five one hundredths to ten one-hundrdeths.

Mr. Townsend—I have had it up to six-tenths.

Mr. Yost—I find it is often one-tenth, even less. I think this would emphasize the fact that we need to study the buttermilk problem. I cannot see why it should be more.

Professor Van Norman—Just one point I want to make in the light of things that have been said here today, and the experience of all of us: It has been interesting to me to see that no matter what subject is up, here is Professor Dean, who comes from Canada, and Mr. Van Dyke, who has been out through the west, as have I and a number of others, and when you get right down to it, the men who are making the high-grade, best butter, and doing it right along, are using wonderfully close to the same principles. Some get those results in a little different way than others, but after all they are getting pretty near down to the same principles. Those who are getting high scores are doing the same as the high score fellows in other places, all of which tends to remind me that it does not make any difference who the fellow is if he gets conditions right and understands the principle he gets pretty close to the same general results. It depends upon the man whether he gets those conditions right and controls them. It makes us feel that there is a science that we want to get pretty close to.

Mr. Walter—You have got to get pretty close to the thermometer. If you do not have the cream at the right temperature, you cannot get the butter fat out of it. That has been my experience for over 40 years. Our buttermilk has been analyzed at different times and one-tenth of one per cent was an average of the butter fat left in our buttermilk. Now, in regard to the ripening process. Probably some of you, like my friend Van Norman, think I am an old fogy. I cannot help that if he does, but we started making butter in the old-fashioned way years ago, set it in a small pan and by degrees we worked up to the creamer. Now, in the ripening in our creamers we use buttermilk, adding it each week. We keep the buttermilk about the same acidity and then in ripening our cream we could use the same amount each time in each can to bring it to the same condition. We found that beneficial.

Now, I know some of you think I am an old fogy and I cannot help it. I was persuaded, after reading about it, to get a separator. We got a separator and used it for about six months. For some reason we could not make the same quality of butter that we were furnishing our customers with separator process that we could with the other process, and our customers were complaining. We have a regular customer for our butter, delivered at the door the year round, and my son reported that there had to be something done. I made every study possible to find out where the trouble was and at last we went back to the old Stoddard way of raising the cream and making the butter and we have never had any complaint since. I do not condemn the separator process. Where you are making butter on a large scale, I think it is preferable, but I do contend now that there are some people here that think it is wrong but I do contend you cannot make the same article of butter with the separator process that you can with the old mother way.

Mr. Hershey—I would like to ask the gentleman how clean you get your buttermilk, and how clean is your skim milk when you are working in the old way?

Professor Van Norman—The percentage of fat in it?

Mr. Walter—I can only answer by saying it took on an average of seven quarts of milk to get a pound of butter. It took the same amount of milk as it did in the old system. There was no change made in the cows and, taking the year through, seven quarts of milk would make us a pound of butter, and it did the same with the separator as with the old Stoddard way.

The President — We have an added speaker on the program for this afternoon S. B. Schilling. Prof. Van Norman will introduce the speaker.

Professor Van Norman—I was out in Chicago this fall and I found a very modest man running around there that I know is a very good talker. I tried to get him to promise he would come here, but he would not promise me. Last night I was walking down the street and who should I see walking around aimlessly without seeming to know where he was going, but this modest fellow I was telling you about. When I asked him where he was going he did not seem to know and he was willing to come along. He is here this afternoon and he is the President of the National Dairy Union, the organization that did the fighting in Congress to get the national oleomargarine law that we now have. Mr. Schilling was not president at that time. He was more than the President, he was doing the hard work. In recognition of the hard work he has been doing they made him President. Mr. Schilling is here and I know we will all be glad to hear from him.

Mr. Schilling—Mr. Chairman, and ladies and gentlemen, I am sorry that Mr. Van Norman took so much time to introduce me to you. Now, I will confess that while I appreciate very much indeed the opportunity of standing before you for a little while, I was in hopes that I would not be called up this afternoon at all. I did not come to Pennsylvania to make a speech. I did not come to talk to you, I came here to listen and to learn and I want to say to you that I feel amply repaid already for the trip from Chicago to your State. In the first place I do not live in Chicago. I wish to correct the impression that Mr. Van Norman gives to you and say that I am an Iowa farmer, living in Iowa practically, although I am compelled to stay in Chicago a part of the time. I am just an Iowa Granger. I will confess to you also it was with considerable feelings of pride that I heard our country referred to so many times this afternoon as being so far in advance of you in the east in the production of butter and in the methods of manufacture and creamery industry. I would like to say the right thing to you. If I were before an audience of our own buttermakers at home, I would know exactly what to say to them. But I do not understand your conditions in this country well enough to know how to say the right thing. However, the character of the subjects that you have upon your programme, the character of the questions that have asked, indicate to me that you are alive, very much alive, and that the very same things that are confronting you now in the creamery system and the dairy system in the State of Pennsylvania have confronted us in the west. All I can say is to emphasize something that has been said the country over. In the first place, I was interested this forenoon in the discussion of the fact whether the character of our butter has deteriorated or not? It has not deteriorated with us and I do not see any reason why it should deteriorate with you. There are conditions in our country that confront us today and threaten the dairy industry, the creamery industry, and the output of every buttermaker in Minnesota and other great butter States. I refer to the great Centralizer creamery interests that have taken possession of our country. When I stand before you and say this, that one creamery company controls the entire output of States I am telling you the truth. I am telling you the truth when I say to you that in my own State of Iowa one creamery company practically controls the entire output of over one-half of that State, they control prices. But the advent of the great Centralizer Creamery Company coming into our country and encroaching upon territory of the individually operated creameries, taking everything and anything, has forced us into local co-operative creameries. I am a member of a co-operative farmers' creamery company.

You do not have these conditions in your part of the country that we have. That is the condition today we do not know how to confront. When you consider the increase in the population of our country, which has been about seven per cent a year for the last three years, and that the decrease in the output of the butter product of the United States has been eight per cent a year we are confronting a situation in which the product has fallen far short of consumption and the demand. That is another reason why anything and everything is sold upon the market and why it has sold, and, as Mr. Dean suggested to you awhile ago, referring to the market conditions, which are not as they should be.

I want to emphasize once more something that Professor Dean said, and that is this, that just as far as you confine yourselves to the four walls of your creamery you are in a position that you should not hold. You have got to get out of that idea. The buttermaker of this country has got to be more than a man confined within the walls of his creamery, he has got to be an instructor. The greatest responsibility of today devolves upon the shoulders of the buttermaker. Today our buttermakers are instructors. The farther we go, the more we see the necessity of this, of them equipping themselves to become instructors, not only in the selection and breeding of the cattle, but in the dairy industry. Do you know, in our State of Iowa we will have this winter anywhere from three to five hundred creamery meetings? You were talking about how to reach farmers. We reach them by having creamery meetings. We will have from three to five hundred of these meetings this winter and the patrons of our creameries will get together and will talk over these matters. The buttermakers are in a position to instruct them along lines of better milk, and of this fine product that we have produced. We have creameries upon which the Centralizer has never been able to make inroads and we are making as fine a product as ever. In Delaware County, Iowa, we never have lost a man. We got together as soon as the centralizer threatened and agreed to stand together and to stand by that creamery of ours just as long as we got empty cans back, whether we got a dollar or not, and we are standing by them today. I want to say our product has not depreciated, it is just as fine today as it ever was, and in fact we are improving it instead of letting it go down. This is only one incident, the creamery industry of our State is small as compared to the whole. I wish I could impress upon you buttermakers today, what rests upon you. We have in the first place State meetings, in which we furnish the entire program. Buttermakers' organizations, county organizations, and local organizations. The membership today of our great National Creamery Buttermakers' organization, of which I have the honor to be Secretary and Treasurer, the strongest probably of any national organization in existence, is the outgrowth of these smaller ones, and its membership comes principally from the west.

I want to leave this one great point with you. I was introduced to you as the President of the National Dairy Union. I want to say this, that if you boys in the creamery will just go to work and improve the quality of your product you are carrying out the greatest and most successful warfare against bad conditions that you can possibly do. The poor product of this country has been a help to the sale of oleomargarine. It is simply a question of quality when it comes down to a fight with that product. I want to say this to you, that at the same time that the butter product of the country has decreased eight per cent the output of oleomargarine has increased nearly 30 per cent—28 and a fraction, in the same length of time. Those are the conditions that confront you buttermakers of today.

I do not know when to stop when I am on this interesting subject. You have taken steps today to secure legislation. It is a good measure. I want to endorse everything that has been said along that line, especially what Professor Dean said, that it is not a matter of police regulation. Now, then, you have got to show what the dairy industry amounts to. That is the fundamental principle for success in the whole business. The fact of the matter is that your farmers of the State of Pennsylvania do not realize the possibilities of the dairy cow the way we do in the west. If you could impress upon the farmer the wonderful possibility of that dairy cow, if you could impress upon him the wonderful profit that accrues to the farmer that handles them intelligently you would have no trouble convincing the legislator upon that bill of the necessity of encouraging that industry. We see and understand that. Just for instance, take the cows of the State of Pennsylvania, somebody made the statement during this meeting that they only averaged about 150 pounds apiece. I have heard it since I have been here anyway, somebody either said it here or in my hearing, 150 pounds of butter. Contrast that with the wonderful cow that you have seen in Chicago in one of the dairy shows, that gave 998 pounds of butter fat in a year. One hundred and

fifty pounds apiece and one cow that was on exhibition at that National Dairy Show under a test by the College of Agriculture in the State of Wisconsin,—and we have no reason to doubt it or dispute it, I believe it is a fact, because I know the man that made the test,—gave 998 pounds in a year.

The President—That was butter fat?

Professor Van Norman—The average of our State is 160 pounds of butter.

Mr. Schilling—Another thing we are finding out is the amount of money we get from the milk is only a part of the profits from the dairy cow to us Iowa farmers. I listened to a lecture last evening in another hall, in which the speaker told of the loss on your farms today. Do you know it is the dairy cow that has built up our farms in the State of Iowa. They probably were fully as low in their value as yours are and that is what has made them worth today from $100 to $150 an acre. Our cows are doing that and we are getting the most out of them.

I appreciate the opportunity of standing before you for a short time. I appreciate the privilege of coming here and I wish I could say something to buttermakers within the hearing of my voice that would arouse them to a sense of the responsibility that rests upon them. I want to tell you boys that the load is on your shoulders. It is you that has got to educate the dairymen of the State of Pennsylvania from the beginning up. Your State Agricultural Colleges are doing a grand work. I think there never was a finer statement than James H. Hill uttered at the anniversary of his birthday in St. Paul a few weeks ago, when he said if he had the making of the legislation of the country, and the appropriating of the money of this country, instead of the government building three or four battleships a year, he would build one and turn from ten to fifteen millions of dollars into the establishment of agricultural and dairy schools.

I thank you.

The President—We are very glad to have the President of the National Dairy Union with us and appreciate his good counsel and hope it will have a good effect in Pennsylvania.

The next topic is creamery difficulties. Open discussion. Mr. Stokes, what do you know about difficulties? Do you have any?

Mr. Stokes—I hardly know where to begin. I came here today not to talk, but to listen. The more I listen the less I have to talk about. I really do not know what to say. One of the topics interested me, and that was the matter of moisture. That was one of the topics that hung over from last year and I have not gotten square with the moisture problem yet. I am not a bit farther on than I was a year ago at Wilkesbarre. The only thing I am satisfied of now is, to see some one that has such standing as the State College has in the community try to teach us how to maintain sufficient moisture in the butter and yet keep from getting in to jail. They say to us if it is over sixteen per cent we are going to be penned up. Just go so far and no farther. But previous to this time the parties who were talking along this line did not have the standing and I was afraid to take their advice, but since the State College has given us such noble advice I feel as if I ought to be able to make an effort to find how far I ought to go and be careful not to go further. That may be all right in money making, but somehow or other that does not satisfy previous teaching and conscience. I do not think it is a matter of how much moisture we can incorporate into this butter, but how good we can make this butter.

I remember in West Philadelphia a party who was running a fine grocery store used a very dry butter. If you tasted the butter you would not consider it a good butter. But at the same time that groceryman was catering to some of the finest trade in Philadelphia. He could not sell a butter with apparent moisture. Why? Simply because he educated his trade to use the dry butter. I will assure you it is just what your trade wants that you should cater to, and not find out how much you can adulterate your butter. I am not in sympathy with our friend from State College about moisture. He tells us in the western States they are incorporating more moisture in the butter. In the same breath he told you three cars out of five have been condemned, two cars have passed inspection. If that is such good butter then I would like to know how far we are going to try the question out. I was rather amused at what Professor Van Norman said this morning, about calling on the kickers, and passing by the spellbinders. I do not know whether he spoke to the President or not, to have him call on me as one of the kickers. A spellbinder I am not, but I have been blamed as being a kicker about seeing how far we can go without being locked up. I am going to tell you this much, that I am not going to try and the question has not been half as live with me as it has been with some others. There is one thing that attracted my attention: Mr. Van Norman asked the gentleman about washing his butter and he said he thought the butter should be washed to get out the buttermilk. He said, "Why do you want to get the buttermilk out?" Well, now I see the point. You want to put the buttermilk in, salt it and leave the moisture in to get that sixteen per cent. I am in favor of what the brother said there, wash it out. I think that is the proper thing to do. Now they also try to tell us in incorporating this you must wash your butter. If I am wrong I wish you would call me down. They say wash the butter with water several degrees warmer than temperature of your buttermilk. They say that should be done to incorporate moisture. Then the gentleman gets up and asks if you are churning butter at fifty-eight, how are you to wash it then?. Then they tell him to put in crushed ice. I do not think that is right at all. I think that man should have been told to use enough ice to get his cream down to fifty-two or fifty-four. I say it is absolutely wrong to put ice in. You are going to put foreign matter there that you have no right to incorporate into your cream. I claim you want to keep out the ice and be sure that your water is right before you commence to handle it around your butter. I think that is one thing that we should be very careful about.

They speak about the west making good butter. I have no doubt, whatever, but I have been guilty of buying a few tubs of butter once in awhile in winter time. No other creamery man would do that but myself, and I know I have found nine tubs out of ten, I believe I can say forty-nine out of fifty, that was just leaky butter without any grain to it. Now, if anybody found it different please jump up and tell me quick. I don't want to stand up here and make statements that are not correct and have you go around afterwards and say, "that man is wrong." I had one man say to me several years ago, after the discussion was over: "You were wrong." He said words that I did not like at all. He was a man that put it right to me. I told him I didn't know whether I was or not, may be I was. I would much sooner he would have corrected me in the presence of company. But I am going to tell you that that butter was sloppy and leaky, and if they wanted to incorporate any more water into it they had better put it into a can and put a screw top on it. I have never had a pound of that so-called western butter with sixteen per cent of water in, possibly more, may be it was some of the condemned butter. I do not know, may be it was not inspected, but it was wet, leaky and sloppy. If my butter was wet like that in the city of Philadelphia it would necessitate sending it back to rework it. You know that trick is played once in awhile. They write to you and say once in awhile, "Butter not up to the mark, what shall we do with it?" A customer in Baltimore wrote me a letter that he could not use the butter I sent them and he said, "What shall we do with it?" I answered, "Send it back at my expense." A few days afterwards he wired he could not do it, it was sold. When we told him to send it back he did not have it to send back and he made return at full price. If you sold butter as leaky as some of that western goods is I know full well that you would have all the trouble you are looking for among your trade. Do you know, my greatest trouble now is to get my butter dry enough, and to keep from hurting the grain? Of course I believe I have trouble in making butter score ninety-nine. You know when they get hold of it it only scores about ninety-two. When there is a drug on the market and they send it in it does not score quite that much.

There was some discussion about the butter not being as good now as it was years ago. I believe the butter is better. It is simply our taste is improving all the time. I believe the buttermaker today is more intelligent than ever. I believe he is trying harder and harder to make a better grade of butter and I believe he feels incompetency today more than ever. Just as soon as you begin to feel you need a whole lot of study that soon you are making progress. If you think you know it all then I tell you that is the time you are going back. There is one thing I could not reconcile: The gentleman said there is an octopus going all over the State of Iowa and is simply buying up the product and controlling the entire output. That is the Centralizer. Now, if that friend of mine in that creamery country is making better butter than he did years ago, I would like to know how the octopus got that hold of his product. If he is making better butter and gets a better price I would like to know how they can ship 200 more miles. I read the best paper printed, the New York Produce Review. It tells about the Centralizer's grip on this, that and the other thing. That may be the octopus the gentleman spoke about. But I cannot see how the Centralizer can reach out over territory 250 miles and at the same time make a product and put it on the market and make money, with the cream that is brought to them. That is the trouble in the west that makes up for our trouble in the east. When he told us that it was a matter of building up the industry I believe he is right, but when it comes down to the thickly-settled districts it matters not whether east or west, I believe it is the whole milk we want to make the best butter with.

I have got a whole lot to learn. I feel today that I do not know everything. I thought I would keep quiet, and I do hope before tomorrow is here I will find a little something contributed here and there that is going to help me out. I do hope you will teach me how to incorporate sixteen per cent of water into that butter and at the same time sell good, honest goods and then I shall certainly feel glad I was here.

The President—We would like to hear from Mr. Hershey.

Mr. Hershey—I hardly know what to say to this meeting. I have a brother here who has had a great deal more experience than I have, so I will turn it over to him.

Mr. Hershey—The difficulties that we meet are numerous and along different lines. About the hand-separator system, I am glad to say, I have no trouble, because we do not receive cream from hand separators and I hope to see the day far distant that it may be necessary to do so. If I can receive whole milk I will be satisfied and will laud myself as a lucky man to continue in that way.

One of the great things that we have to confront is about cleanliness. An instance I met with was a woman brought us dirty cans. I went to work and cleaned those cans and used a washing powder on them and they looked pretty near as they looked when they came from the shop. She wrote to me and asked what the bill was.. That is one of the difficulties we meet in the operation of creameries in this part of the country. We also have another difficulty arising along this line, too many creameries spring up in certain territory where one could be operated at reasonable expense; several increase the expense, which naturally adds to the cost of the product.

Referring to the buttermilk question, I would say my experience is that if I find I can churn so my buttermilk will test from five one-hundredth to one-tenth I

am in several pounds. If I found I was having butter fat in my skim-milk to four and five-tenths, like some made mention, I would run it through the separator and see what I could get out of it after running through the churn. The temperature of the cream would naturally tell me it was churned at too low a temperature. Of course I came to hear some of our longer experienced buttermakers. I refer to Mr. Swope, who has taken some of the prizes at the Exposition several years ago.

Mr. Swope—Talking about difficulties reminded me about this milk coming in. I know that I had milk coming in and the cans really were not fit. That we all know is hard on the quality. One day I went to work and told the person that brought the milk in that those cans need cleaning; I thought they ought to go in with a brush and clean those cans out. The next day, of course, when the team came in they told me that they knew when cans were clean and all this and that. I said, "I know that, too, and I want it understood that the cans ought to be cleaned." From that time on they cleaned the cans and instead of bringing me milk every day sour, they brought in every two days sweet. Then, of course, there are different difficulties a person could speak about, but I think that is about all I want to say.

The President—We would like to hear from some others.

Mr. Larson—Mr. Chairman. I find the overrun very low in this State, not more than twelve per cent in some cases. I have figured the amount of overrun on a good many churnings, several hundred, and I find the overrun usually as low as fourteen and fifteen per cent. That should certainly be increased.

Mr. Stokes—How much?

Mr. Larson—I think we ought to get eighteen per cent.

Mr. Stokes—That would give us how much moisture?

Mr. Larson—Not quite fourteen. I certainly do not believe in high moisture. That is why I emphasized the danger of it. I do not believe in high moisture, I emphasized that, I thought, but I do believe the overrun should be increased, and it can be increased without hurting our butter in the least.

Mr. Stokes—But I understood you to say you had some in the market and the high moisture tests was leaky butter, and those with ten per cent of moisture did not have.

Mr. Larson—That was not it. In speaking of the tests of the butter I made the statement that a large part of the tests of butter that contained over fourteen per cent of moisture was criticised as being leaky, that is true. But it was leaky because they did not use the right methods, while others were getting butter with good body, which proves that it can be done. Some butter makers frequently are getting as much as fourteen per cent and do not know it. If it is right today and right next week it is right to control it and get uniformity day after day.

Professor Van Norman—May I say a word on this topic at this time? The points that Mr. Stokes brought out are worthy of serious consideration, but in the enthusiasm of his oratory he did not quite quote literally some things Mr. Larson said, but if every man in listening to another would make a little allowance and take the spirit of what he said, I do not think we would differ on essentials. He did misquote some of the things that have been said, but he did not mean to do it, I know. As the head of the department at State College, let us set our relation to the dairy interest to do the things it wants to do, or ought to do. If we err in our judgment we are ready to stand corrected. Now, then, in regard to this moisture business, let me state it this way: It has been demonstrated over and over again that a man can put fourteen, or a little more per cent, of moisture in the butter and have a butter that to all intents and purposes is dry and to the eye; it will look dry. Furthermore, I know of butter selling in Philadelphia at sixty cents a pound, and of other butter selling at wholesale at seven cents above quotations. I sat in an office and heard a dealer say, "You may know that our price is always seven cents above market price," and I know furthermore that these people are putting fourteen per cent of moisture into their butter and selling it to that kind of trade.

I am not saying to Mr. Stokes he should go and do that, I am simply saying to him it is done and can be done, and we think we can show you how to do it if you want to do it. If you are selling butter to a trade that wants the kind of butter you are making and does not want this other kind your business is to sell your trade what they want. Let me say to you, if you are satisfied with ten or twelve per cent overrun, when your competitor can get eighteen per cent overrun and four or five or seven cents a pound above your price for it, all right. But when you turn around and complain,—I am not saying you are complaining,—I will put it this way: When a buttermaker who cannot do these things comes around and complains there is no profit in the creamery business and the margin is getting less, then I say he is complaining wrongfully. If you are getting profit enough and are satisfied with your conditions we have nothing further to say, but most people want a reasonable profit, and a goodly portion of these people want all the profit they can get, and it has been shown over and over again that we can enlarge the profit and still make a butter that will please a large portion of the market and still come within the moisture limit. It has been said by some of the best commercial butter judges that butter with fourteen per cent of moisture will spread better than butter with nine or ten per cent, the texture of that butter is better to handle. There may be in Philadelphia, or somewhere else, a class of people that want the dry pastry butter. That is true for the same reason that the boy who was brought up on sour bread, prefers that kind of bread. The mother made that kind of bread and fed it to the children. The mother ate that bread right along, the boys ate the bread, and they thought it was just as good as could be made, and when they went to a neighbor's they complained that the bread was not good because it was not like mother's. It is true, a great many of our Philadelphia consumers like dry butter. They become educated to the dry, pastry butter. If you gave them the other kind right off, of course, they would kick, but if you are convinced that there is a way to incorporate that moisture so as to make a dry butter and gradually increase that per cent of moisture, and at the same time satisfy those customers and increase your dividends, so far as I can see, there is no moral, business or legal reason why you should not do that. If on the other hand you are convinced it cannot be done, you are under no obligations to try to do it. But there are a lot of people turning to us in our capacity as teachers, for helping along these lines. One man whom I have heard say at our different conventions that this could not be done has admitted to me and my representatives that it can be done and that his men have got to do it. Another man got up in one of our meetings and criticised in less kindly fashion than you have done. The attitude of myself on this very point, and on our invitation he came to the college and in three days he was satisfied the statements were within the bounds of reason. We are not attempting to say what you should do, we are simply saying what can be done, and if anyone wants to do things we are willing to help to do them.

The overrun does not hinge entirely on the moisture. It hinges partly on the loss in skimmilk and in the buttermilk. I am sure some of the buttermakers are not testing every churning. They do not know what they are doing. Others do not know what the separators are doing and are wasting cream, here and there little things are passing unnoticed. They are not human if they are not doing that. These are some of the things we are turning our attention to.

Another point leads me to refer to the Centralizers in the west, how can they pay these prices. When they are trying to get as near the legal limit and make a butter between sixteen per cent and fifteen per cent moisture they are getting an overrun that means a cent and a half or a cent and a quarter more a pound for butter. That is why the Centralizer can do these things, because he is getting more out of it. I went to one of the Centralizer factories in Chicago where a girl does nothing except to determine the moisture in every churning. Before a buttermaker can take out a churning he has got to know exactly what he is doing. If he gets sixteen and a quarter per cent he has got to reduce it. Gentlemen, that is just what we have got to do, we have got to figure closer to the absolutely scientific truths, to the fundamental principles. It was the Centralizer, if I miss not my guess, that opened our eyes as to the overrun. It is not so very long ago since "I was from Missouri," and I said, "You will have to show me." With what I happened to know about the dairy business it did not take very much to convince me that there was a little point we had missed and the Centralizer was the first to find it.

Another statement was made about buying butter from the west and that your butter does not come up to the best. Whom do you get butter from when you are short? You are getting from the fellow that has to sell his in the open market. Do you suppose today I could go to Philadelphia and buy the best butter for an occasional shipment? No, sir; every commission man and storage man that has butter to sell has a regular market for the best butter that he can get and we have got to be satisfied with a grade just a little below the best. When there is butter retailed in the city of Philadelphia at sixty cents a pound and men who are looking for more of that kind of butter, then I think some of the rest of us ought to be interested in how to make our butter better so that we can get more for it and help them out.

I have heard this said: "I do not understand why it is, I can get a cent above quotation from my regular customers and yet when I send it to the town market they dock me two cents below and give me a low score." The reason is that the butter that pleases his regular customers because they are used to it, and it will not always please the open market. I beg your indulgence a moment more to emphasize still further this thought, that when there is uniformity of product, even uniformly bad, people get used to it and many times they will be satisfied with it. I have heard of an egg producer who recognized this principle, and so he fed his hens celery and it gave the eggs a little flavor. It was not enough so that you could tell what it was. Then he put the eggs into nice little boxes and labeled them, "If the eggs do not taste like these they are not fresh." When people bought the eggs that did not have the celery taste they thought they were not fresh. You see, they got used to the flavor and the same thing is true about the butter, many customers are satisfied if it comes just alike from day to day. But in making the change, if we are going to make a change, we must not forget that that change must be made gradually and the same is true in regard to sending letters out. You know you can call a man a liar and he will knock you down before you can draw the next breath. On the other hand, you can intimate to him that you have not much faith in what he says and that his statements are not founded upon facts, and he will not say anything about it. Yet have you not questioned his veracity? In the same way you can tell the farmer his milk is not what you want and you will make him mad. You can find some other way to make that complaint and most of them will respond to it.

In regard to scoring, I have not seen the scores of our butter over here, but the butter was scored by a man the government keeps in New York to score butter. Most of our Pennsylvania butter, I think, goes directly from the buttermaker to the distributor, and therefore it does not get criticism and comparison, it does not have to. But Minnesota, Iowa and Nebraska, those western States, are producing more butter than they can possibly consume. Therefore they must seek a market away from home, and when it comes to Philadelphia and New York commission stores and the grocer comes in and wants butter. He looks at the different lots from Iowa, Minnesota, Wisconsin and elsewhere and picks out what he wants. Where does our butter go? To the Smith Grocery Company, in the mountain region; one maker sells him all that he wants, and there is nothing to compare it with, and lots of people have thought the butter they were getting was good butter until they bought some other butter besides it. Mr. Freyhofer scored our butter, some ninety-four, one or two lots ninety-five, and he is the man who scored Minnesota butter and Wisconsin butter, so that our scores will be comparable with western scores. Mr. Freyhofer was asked to score for the simple reason that we happened to know he has demonstrated his ability to score. We had the last time B. D. White, from the United States Dairy Division, for the same reason. I have had the pleasure of seeing some of our low scorers come up, and we have fortunately been able to make some suggestions. We do not know everything, we cannot know everything and do not know it all, but anything we do know is at your service. I believe the essential thing is to understand each other and if we seem to disagree, as the old fellow says, let us argue it out, and we will soon get straightened out and we will be all right. I think in regard to adopting our suggestions, that it is a thing each man must determine for himself, whether his condition justifies the changes which we think possible.

Mr. Schilling—I feel a little explanation probably due to the members. While I do not believe I was misunderstood in my statements in regard to the Centralizer, I believe Professor Van Norman has practically explained why they have been able to do as they have. But that is not the main thing. The reason is that they simply control a vast territory. They go into a place where they want the cream from that district and they will raise the price of the product anywhere from five to ten cents a pound and pay correspondingly low at another place. twenty-five or fifty or one hundred miles away. There is the secret of the whole thing. It is not because there is any danger of their hurting us. We are making a good quality of butter. As I said to you, it is only a small area of our State.

I have just got to say a word on this overrun question: I am a little surprised at the gentleman. To me it is not a step in progress. It is possible I look at it from the farmer's standpoint. I am in the dairy business for a living. If he is honest, and if any farmer is honest, they will look at it in the very same way, they are not in it for glory. I want every dollar I can get out of it. but I want to stay within the pale of the law. I want every dollar that is coming to me, and I do not want to violate the law to get it. If the law allows me to get sixteen per cent moisture in there I want to have it. Further than that, if a buttermaker does not get twenty per cent overrun, he is not going to make it go. It is not a matter of sentiment, it is a matter of dollars and cents. While my position may be wrong, I feel that I am right. I look at it from a business standpoint. Further than that, I feel that it is possible to incorporate it and I feel that we have demonstrated it, this fifteen per cent of moisture can be incorporated and produce a fine quality of butter.

Professsor Van Norman—The Iowa butter is sold in Philadelphia.

Mr. Schilling—Understand our fine butter is contracted for, and as Professor Van Norman said, it does not go on the open market, it is sold under contract. I want to say to you, we are not satisfied with the fourteen per cent of moisture, even if it goes to your Philadelphia market; we want at least eighteen to twenty per cent overrun. It is money in our pockets. Every dollar we get goes into our pockets and when you come to figuring with us farmers we want what is coming our way and we want to get it without violating the law.

I would like to tell a story. May I?

The President—Yes.

Mr. Schilling—Now, I told you I used to be a buttermaker, and I intend to tell this story to you to show the kind of interest that makes a dairy go. I tell you a dairyman has got to be an enthusiastic man. He has got to be earnest and this story I am going to tell you illustrates the enthusiasm necessary to be a good dairyman. It is about a lot of men going into Chicago one day on a railroad train. They were arguing upon the merits of their respective cows. The Jerseyman said: "I have a three-year-old heifer, the first year she was fresh she gave 300 pounds of butter-fat." Soon after that the Holstein man said: "I have a three-year-old heifer; the first year she was fresh she gave 350 pounds of butter-fat." The "Guernsey" man got up and said, "I can beat that, I have a three-year-old heifer who gave 400 pounds of butter-fat the first year she was fresh. At last the "Shorthorned" man, sitting in the back part of the car, got up and said, "Gentlemen, I want to say that I have a three-year-old heifer who gave 450 pounds of butter-fat the first year and she never had a calf in her life, and her mother before her never had a calf." That is the kind of enthusiasm it takes to make a dairyman.

Mr. Stokes—From the standpoint of getting excitement here I feel that my speech has been a success. I sat back here half asleep when the chairman called on me, and if he would have left me alone I would not have done it. I want to tell you now, after this when you do not want to have trouble do not get me to speak. I am sure if you do I will raise all the trouble I know how. It is part of my business. I am glad to see that everything is taken so good-naturedly and good heartedly.

The President—We are very glad we called upon you.

Mr. Mower—I would like to know in what way you can use buttermilk up if you want to use it to the best advantage.

Mr. Marshall—I try to find sale for the most of mine, and do find sale for the greater part of it and get a cent and a half a quart.

Mr. Mower—In what way?

Mr. Marshall—In Philadelphia.

The President—How far do you have to ship it?

Mr. Marshall—About twenty-two miles. We generally churn in the morning and we can ship it from the creamery at about twenty minutes to seven. It gets into Philadelphia about 10 o'clock to 10:30. We do not always have sale for all of it, but we most always have sale for some of it and sometimes all of it.

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Mr. Perham in the Chair.

The Chairman—The meeting will please come to order. This is a joint session of the Dairy Union and Breeders' Association. There are a few committees to be appointed. There will be a banquet this evening, and the first thing will be to appoint a committee to solicit for the banquet.

President Norton—I would appoint on this committee Mr. J. F. Lantz, Mr. M. P. Shoemaker, and Mr. Henry Palmer. I think that is all that is necessary.

President Perham—And I will appoint on that committee Professor H. E. Van Norman, Mr. B. F. Gabler, and Mr. G. B. Brown.

The Committee on Resolutions for the Dairy Union was named yesterday, but I will read the names again this morning. This committee consists of T. D. Harman, E. R. Stevens, C. W. Larson, O. D. Mott, and W. D. Marshall.

The first topic on the program this morning is "Market Milk," by C. B. Lane, Acting Chief Dairy Division, United States Department of Agriculture. I don't think Mr. Lane needs any introduction to you, but I have the pleasure of introducing him.

Mr. Lane's address follows:

# MARKET MILK

## By C. B. Lane, Acting Chief, Dairy Division U. S. Department of Agriculture

Mr. Chairman, Ladies and Gentlemen—We are here today to consider the most important food, the cheapest food, the food that nourishes four-fifths of the babies of this country, the food that has no substitute, the food that has been called God's best gift to man, pure milk.

The problem of providing clean, healthful milk for the ninety million people of this country is occupying the attention of the physician, the chemist, the bacteriologist, the veterinarian and the sanitarian as never before. It is only a few short years since the science of bacteriology has been applied to the milk supply of cities, and since we have really given this subject of milk much serious thought. When I was a boy on the farm, milk was milk, and one farmer's milk was considered just as good as another's. Sometimes it was dirty, but no special attention was paid to it. Now, since we know more about bacteriology, since we know more about the cause of disease, since we know that poisonous toxins develop in dirty milk and produce disease and death, we are giving more attention to these matters.

The question of sanitation, then, is one that is uppermost in the minds of people today. No science has made more rapid progress during the last few years than this. The entire civilized world is throwing itself into the fight against unnecessary and shameful loss of life resulting from insanitary conditions, from impure milk, and from all impure food supplies. It is said today that national intelligence may be known by a given nation's national sanitation. General conditions being the same, the city having the best milk has by far the lowest death rate. One city in our own country reduced the death rate more than one-half through a better milk supply. The city of Copenhagen, Denmark, which once had the reputation of a high death rate, now has one of the lowest in the world, for the same reason.

The demand is made that the dairymen of this country improve their methods, adopt new standards, and meet new demands. Some of the sanitary theories may be overdrawn and some unfair demands may sometimes be made upon producers, but there is one thing certain, that the dairymen of Pennsylvania and of every other State will have to deal with this reform movement, and how he can best do it is the problem we have before us here today. I might say here, that the demand is also made, and rightly, that the customer do his part toward bringing about an improvement in the product which he has on his table daily.

If I were to pass judgment on the producer the credit for having advanced farthest in doing his part in the fight for pure milk. The consumer needs to be educated to take proper care of milk when it reaches his door. Unfortunately, the law stops at the consumer's door, but it follows the producer all the way from the cow to the kitchen. If we should examine conditions today, we should find many a filthy ice-box that was ten times worse than the dairyman's milk house ever thought of being.

The consumer needs to look up the source of his supply and to pay the dairyman a living price when the product is delivered to him in good condition, and not be looking for the cheapest milk he can buy. The average consumer is surprisingly ignorant concerning his milk supply. He not only does not realize the importance of having pure milk, but is ignorant concerning its greater cost. Three-fourths of the milk consumers of this country have never looked up the source of their supplies or seen any account of it. The consumer has often been held up in a favorable light by those who have agitated the cause of better milk, but, as a matter of fact, the milk dealer who rubs up against him, knows that he is usually only concerned with the lowest price at which he can buy milk that is sweet and has lots of cream. Your dairymen all over the country have speculated to their sorrow on the theory that people will pay extra for milk that is clean. To prove this, if we investigate the milk business in any large city, we shall find that the dirty, careless, price-cutting distributor is still patronized and still holds on to his business. So I say that while some dairymen should be denounced for the methods they pursue, at the same time a demand should be created for better milk on the part of the consumer, and I am convinced that such a demand would be readily supplied. It is true that some progress is being made along this line, for which some credit should be given to the producer and dealer, some to laws and regulations, but very little to the consumer. He is the stumbling block in the work of improvement, and it will be necessary first to educate him, before any very rapid progress can be made. Just as long as the consumer demands cheap milk, just so long he is encouraging uncleanliness, the keeping of diseased cows, the watering of milk and the use of preservatives.

### Not Altogether a Question of Higher Price

The fact should not be overlooked that the vital question financially is not so much securing a better price as it is cheaper production. To illustrate: In one county in your neighboring State that was investigated, it was found that more than half of the farmers were getting less than 3,500 pounds of milk a year from their cows, and more than half received less than a dollar for every dollar they spent in food. We need to look at things more and more from a business standpoint. Is it to be wondered at that these men receive only beggarly returns from their cows when only one dairyman out of ten read any paper devoted especially to his life work?

### Our Ideals Are Changing

With higher ideals of food products and better knowledge of bacteria and sanitation, our viewpoint is constantly changing. What was considered clean milk five years ago is not considered clean milk at all today.

The commercial value of milk and cream has, until recently, been rated entirely on the basis of the fat and solids they contained; but now we are going a step farther and giving attention to the preparation of market milk as distinct from production and a standard is required not only for its chemical composition, but for dirt, bacteria, pus cells, tsmperature, freedom from disease germs, etc. In other words, cleanliness is considered a commercial quality and we are depending more and more upon the laboratory to assist in regulating the quality of the milk supply. This is as it should be. We have never given attention enough to this matter.

### Incentive to Produce Better Milk

I saw this statement in a recent dairy paper—"No encouragement is offered the sanitary dairyman except that branch known as 'certified milk' where extremes of expense have often made the product prohibitive." I cannot entirely agree with this for there is beginning to be a decided trend toward better prices for better milk. For example: One large milk company in a certain State notified the farmers that 10 cents per can would be paid over and above the market price to all dairies scoring more than 75 per cent. by the dairy inspector, and to all dairies whose premises scored less than 60 per cent., a reduction would be made; and further, that no milk would be accepted from farmers whose premises scored less than 50 per cent. Now nearly all the leading companies have a clause in their contracts concerning the sanitary condition of the dairies. The New York City Board fo Health now issues a certificate properly engraved, setting forth the high rating and excellence of farms scoring 90 or above. These certificates have aided dairymen to secure better prices for their product in hotels and private residences and the consumer has the satisfaction of knowing that the milk is produced exclusively on premises where proper attention is paid to sanitation and the health of the animals.

### A Few Points in Milk Production

The dairy industry, as far as it relates to the production of market milk, is rapidly undergoing a revolution and the changes demanded by the Boards of Health must necessarily increase the cost of production somewhat, but not to the extent that we are sometimes led to believe. Many of the careless methods which have been sanctioned in the past must go, and I think we are now agreed that they should. I believe the majority of dairymen are willing to do their part, but they do not want to be insulted into doing it, and you cannot blame them. What then is required from the present day standpoint? In a few words, the demand is for clean, healthy cows, well lighted, well ventilated and clean, airy stables, tight, sound floors, clean, healthy attendants, clean utensils, prompt removal and cooling of the milk in a proper room used exclusively for the purpose and storage at a temperature below 60 degrees.

I cannot recommend too strongly the use of the small-top milk pail in eliminating dirt and bacteria. In one instance where a study was made of this point, it was found that where the ordinary open pail was used, the bacteria count was 3,439,000 per cubic centimeter, as compared with 6,600 with the small top pail.

Again, the use of the damp cloth in wiping the udders and flanks of the cow before milking, is very important in reducing the bacteria count. Stocking found that where this was practiced in one instance, the number of bacteria in the milk was 716 per cubic centimetre, as compared with 7,058 per cubic centimeter where the moist cloth was not used.

I would like to call attention, also, to the question of straining milk. I am satisfied that the dairymen are giving altogether too much attention to finding a strainer that will remove the dirt and too little attention to proper care and cleanliness in keeping the dirt out. In most instances when the milk passes through the strainer, nine-tenths of the bacteria and all the bad flavors in the milk pass through also and all that remains is some coarse matter that can do no harm.

Dairymen should learn that milk once dirty can never be cleansed by any process.

### Production of Clean Milk Not a Hardship

To illustrate: One dairyman had a bacteria count of 1,200,000, when sampled three hours after milking. Considerable time was spent in studying out a method of improvement which might be adopted at a small cost. Finally, a few more windows were put in, some canvas ventilation was used, a few coats of whitewash were applied, the milk was carefully cooled, and then the bacterial count of this milk came down to 100,000 per cubic centimeter at the same age. The cost had been about two dollars, and now the milk was declared good enough for anybody to drink. From this illustration we are led to believe that the production of clean milk is not altogether a question of greater cost, but, rather a habit.

### Responsibility of the Health Officer

Laws must always be in force for the willful lawbreaker, the careless and the ignorant, and the public should mave a right to protect itself from disease or any impure product. Some of our city health departments have perhaps been a little too radical and have not always met the producer half way. The Health Officer shoul have patience and should endeavor to point out to the dairyman his faults and give him a fair chance to improve before condemning him. Co-operating is a good deal better than clubbing. Of course, it is understood that the persistently dirty dairyman must be dealt with with a firm hand, but the point I want to emphasize is, that the majority of dairymen are not wilfully dirty and that they are willing to do anything reasonable. But they need to be condemned less, and assisted and instructed and encouraged more. If the inspector could be looked upon as an instructor rather than as an official inspector on police duty, many of the difficulties between Health Boards and dairymen would disappear. Such instruction should be given right at the dairy farm, with the dairyman on the spot, and it should be given by capable and practical men. The dairyman has often had good reason for objecting to inspection. For example: An inspection force was appointed in a Western city, recently, which consisted of an engineer, a detective, a solicitor, a machinist, and an ex-policeman—a good example of what poor politics is doing in some of our large cities.

### The Score Card System of Inspection

The score card system of dairy inspection has proved very valuable to Health Officers in keeping records of all dairies in convenient form for ready reference; in keeping tab on the work of dairy inspectors, and as a basis for issuing permits. The following diagram shows how the City of Richmond, Virginia, raised the average score of dairy farms from 41.5 to 72.0 (73.5) in twelve months through the score card system.

(From Report of E. C. Levy, Health Officer.)

### Advantages to the Inspector

The score-card system shows the inspector what to look for, making it impossible to overlook any point of importance. The ratings of the dairies are kept as a permanent record by this system, and comparisons can readily be made from one inspection to another and improvements noted. It aids the inspector in making explanations to the dairyman, and he becomes an instructor and friend, rather than an officer whose visits are to be dreaded.

### Advantages to the Dairyman

The score-card system points out details in the production and handling of milk, this making it clear where the defects are and what ideal conditions should be. It encourages confidence among dairymen, as they all feel that they are being treated alike. It also leads to greater profits, as more attention is given to details, which is an important factor in any business.

### Publicity Aids in Making Improvements

The publication of the results of inspection has a strong moral effect. Most dairymen have pride enough not to want to be at the bottom of the list, and if their record is published, there is a constant incentive for them to come up higher. The following shows the method of publishing scores in one city, as well as the condition of the dairies :

### Dairy Scores, 1906

| Dairyman. | Cows. | Stables. | Milk House. | Ratings | | Total. |
|---|---|---|---|---|---|---|
| | | | | Handling of Milking. | Handling of Milk. | |
| (Perfect Score) | 20 | 25 | | | | |
| No. 1 | *18 | 21 | 20 | 15 | 20 | 100 |
| No. 2 | *19 | 22 | 20 | 15 | 20 | 94 |
| No. 3 | 12 | 19 | 20 | 12 | 19 | 92 |
| No. 4 | 10 | 21 | 20 | 12 | 19 | 82 |
| No. 5 | 11 | 19 | 19 | 13 | 19 | 82 |
| No. 6 | 11 | 19½ | 18 | 12 | 19 | 79½ |
| No. 7 | 10 | 16 | 18 | 12 | 18 | 78 |
| No. 8 | 11 | 19 | 20 | 12 | 19 | 77 |
| No. 9 | 9 | ,20 | 19 | 12 | 15 | 76 |
| No. 10 | 9 | 19 | 19 | 8 | 19 | 75 |
| No. 11 | 11 | 18 | 17 | 11 | 18 | 74 |
| No. 12 | 11 | 11 | 13 | 12 | 17 | 71 |
| No. 13 | 11 | 14 | 16 | 12 | 18 | 68 |
| No. 14 | 9 | 11½ | 16 | 9 | 15½ | 66 |
| No. 15 | 11 | 13 | 15 | 10 | 15 | 60 |
| No. 16 | 9 | 19 | 13 | 10 | 11 | 58 |
| No. 17 | 8 | 10 | 4 | 12 | 14 | 58 |
| No. 18 | 10 | 8 | 4 | 12 | 14 | 48 |
| No. 19 | 8 | 10 | 6 | 9 | 12 | 45 |
| No. 20 | 9 | 13 | 4 | 10 | 12 | 44 |
| No. 21 | 6 | 8 | 4 | 8 | 9 | 43 |
| No. 22 | 5 | 2 | 4 | 9 | 12 | 39 |
| | | | 6 | 5 | 15 | 33 |

*These cattle are tuberculin tested.

### Inspectors' Report of a Bad Dairy

Mr. A.—This is one of the most unsatisfactory supplies coming into town. The quality of the milk has been very poor, and the bacterial count high throughout the year. As will be noticed from the "dairy scores," Mr. A. has a very poor stable; he bottles the milk in the basement of his house, and he has no sterilizing apparatus.

### Inspectors' Report of a Good Dairy

Mr. B.—This supply is well known to be first-class in every respect. Mr. B. has an up-to-date dairy with modern equipment, and his cattle are regularly attended by a veterinarian. During the past year one herd has been tuberculin tested, and his other herd is to be tested, which makes his milk all the more desirable.

What kind of a record have you?

Are there any questions?

A Member—I want to tell you the state of things in our country. A dairy inspector, sent out by the Board of Health, came down and looked at some cattle, and said: "Well, things are about as good as I expect to find them." I asked him, "What do you know about milk?" He said, "Nothing; I never milked a cow, and know nothing about them." He was a physician by profession. Now talk about milk inspection, when they send out that kind of men!

Mr. Lane—You are exactly right. In the Western city I spoke of, they sent out an engineer, a detective, a solicitor, a machinist, and an ex-policeman as inspectors. Now, that is not right. A milk producer can reasonably expect that the inspector will be able to point out deficiencies, and help him improve all along the line, and he must not expect that it has all got to be done in a minute. He must give the man time. Some of the dairymen who have been in the business thirty, forty or fifty years, do not understand why the methods which have been "O. K.'d" in the past by the Health Officers have suddenly been condemned. They do not understand it, and, as a fact, I think they should have practical instructions from the dairy inspector.

Mr. Sharpless—I wish you would tell us how long it would take the ordinary dairyman to count eighty or ninety million bacteria.

Mr. Lane—He is not expected to count them; he is expected to keep them out of his milk.

Mr. Van Norman—Don't you think a good rule to reduce the bacteria count is to discard the fore milk?

Mr. Lane—Well, there is some question about that; some cows will have a good many more bacteria in their udders than others; there may be more conditions that produce them; in certified milk plants, where the bacteria count has to be kept very low, they may do this, but they are also careful to wash the udders and flanks of the cows, and use the small-top pails. Up in Newberg, New York, where they have had a count of 183 bacteria for four months, the udders are washed, and everything is kept perfectly clean, but they do not discard the foremilk any more. Now, in the average dairy, where everything is not kept so perfectly clean, it may be well to discard it.

Mr. Van Norman—My own experience has been, with a herd of 90 cows, where it would be impracticable to wash the udders and flanks of the cows that discarding the foremilk reduced the bacteria from 15,000,000 to from 4,000 to 7,000.

Mr. Conklin—What kind of men are making the inspection of dairies? What kind of men are doing it in the thousand dairies in the neighborhood of Washington?

Mr. Lane—If you refer to the State of Washington, they have five inspectors there who are the dairymen connected with the Board of Health, and it is their business to see that the dairies contain no diseased animals so far as can be discovered by a physical examination. In this case the inspectors are all cattlemen, but that is not so in most other cases.

Mr. Dodge—You spoke of certain cows who derive bacteria from contact. What is the cause of that?

Mr. Lane—It is due to some abnormal condition. A cow may have garget, or some abnormal inflammation, and never entirely recover from it, and it has been discovered that in this condition the cow may for several months have a large bacterial count.

Mr. Dodge—Milk coming from a healthy cow, under sanitary conditions, is pure?

Mr. Lane—Yes, sir; under ordinary conditions, absolutely pure.

Mr. Van Norman—You say the farmer must do certain things; now, we know that some farmers are not in condition to produce what the inspectors call "clean milk." Why not make the bacteria the test? If his milk comes up to a certain standard, why not give the farmer the benefit of it? Why is it that you do not make the milk produced by the farmer the test, instead of the conditions under which it is produced?

Mr. Lane—You are perfectly right in assuming that the dairymen have had a hard condition to meet in turning out a good product, but it is the same thing in the commercial world, and in everything else that is undertaken.

President Perham—I want to ask what inducement the Boards of Health, as a rule, are offering these dairymen; what advance in price, if any, for a good, clean wholesome product? Will they pay any more for it than for the common, ordinary milk?

Mr. Lane—Of course, it is not the business of the Board of Health to fix prices; it is their business to create a demand for good, wholesome milk, and then the farmer has to fix the price. Of course, they do some work along that line, but it is hardly the work of the Board of Health to do that.

President Perham—Now, in the community where I live, our milk is all shipped to New York State, and the consumers who are most particular about it are those who pay the least, while those who are willing to take anything that comes along are willing to pay 10 cents per hundred-weight more.

Mr. Lane—The man who refuses to pay

the price of good milk should not be able to get it. We are slowly getting to the point where the dealer will have to pay more money for better milk. I have mentioned several instances where the dealer has put a premium on better milk as an inducement to go up higher.

President Perham—But it looks to me as though the city that wants pure milk would offer the farmer some inducement to make it.

Mr. Lane—It is slowly coming to that.

Dr. Conard—I am very much interested in Mr. Lane's account of the work of the City of Richmond; it coincides with some work done in this state, in a limited district, largely through the work of the State Live Stock Sanitary Board. It has been operative only during this last year, and in cities where its provisions have been enforced they have been very fortunate, indeed. The State Live Stock Sanitary Board co-operates with the local Board of Health, in seeing that the herds are free from disease. In four cities of the Western part of the State they employ a local Commissioner, and are getting excellent results.

Mr. Lane—I hope you get the right kind of inspectors.

Dr. Conard—That is very important, and has been done so far as is possible. A good thing can be spoiled by one poor man. We have tried to instruct the dairyman, rather than to criticise him; the inspector has gone over the ground and taken into consideration the means of the man, and then outlined a plan by which he could improve his conditions, and still keep within the limits of his means. I know dairies need just the things mentioned—better ventilation, more light, white-washed walls, and more sanitary milking into small-top pails. All these things have been kept in mind, and our dairymen have been instructed, rather than criticised, and when the instructor left the man did not feel that he had been even instructed, but that he had been educated, and that is what we want, inspectors who will educate the man whose methods are improper. It is a matter of education only, and I want to say that the people who have been instructed have received it with open arms. They say, "We are glad to have you come back at any time"; that is the way the instruction is received.

Mr. Lane—That is the right idea.

A Member—Coming back to the question of diseased udder, with several cows in the herd, it seems to me that it increases the bacteria in the entire herd. But if you do not find any diseased condition, would you think that the stripping of the fore milk would keep the bacteria down? If the cow were diseased you would find pus there, would you not?

Mr. Lane—Of course, if the udders are not thoroughly washed, throwing out two or three streams of fore milk will throw out a large part of the bacteria, but if the cows are kept thoroughly clean this need not be done.

A Member—But in a large herd, it would keep five or six men busy washing the herd, and you would hardly care to go to that expense.

Mr. Lane—You could hardly afford to go to that expense, either.

President Norton—If there are any more questions, we will be glad to hear them.

Mr. Van Norman—I think in regard to the testing for bacteria, you are beginning at the wrong end. What you want is clean milk, and the conditions under which it is produced do not matter. This way, the conditions under which it is produced, rather than the milk itself, is made the test.

## Constitution of Pennsylvania Dairy Union.

### Article 1.

The name of this organization shall be The Pennsylvania Dairy Union.

### Article 2.

It shall be the object of this organization to promote, protect, encourage, and develop the dairy interest of the Commonwealth by every means within its power.

### Article 3.

Any person, firm or agricultural organization interested in dairying may become an active member for the calendar year on payment of one dollar ($1.00), or may become a member for life on payment of ten dollars ($10.00.)

Associate members: Any agricultural organization that is an active member of the Pennsylvania Dairy Union may have its members listed as Associate members for the calendar year on payment of twenty-five cents (25) for each such member. Associate members shall not hold office or vote.

Any one rendering this organization noteworthy service, may by a unanimous vote at any regular meeting, be chosen an honorary member. Honorary members need pay no dues, they may participate in business, but not vote nor hold office.

### Article 4.

The officers of this organization shall consist of a president, one vice president, a secretary, a treasurer, and six directors, all of whom shall be elected by ballot at the annual meeting, and shall hold office for one year. The president, secretary and treasurer, together with the directors elected, shall constitute a board of directors.

### Article 5.

1. The president, vice president, secretary and treasurer shall perform the duties ordinarily appertaining to those offices.

2. Between the meetings of the Union, the board of directors shall have the general management and control of the property and affairs of the organization, subject to the Constitution and By-Laws.

3. Four members of the board of directors shall constitute a quorum to do business.

4. The board of directors shall organize by the choice of a chairman, and a secretary, and may adopt such rules and regulations as shall seem desirable for its government and may appoint such committees from its own members or from the general membership of the Union as it shall consider desirable.

5. It shall be its further duty to decide the location and date of the annual meeting of the organization, and to make all necessary arrangements therefor.

6. No expenditure of the funds of the organization shall be made except by a majority vote at a meeting of the Union, or as authorized by the board of directors, and all bills shall be approved by the chairman of said board, before their payment by the treasurer.

7. The board of directors shall serve at each meeting as a committee on resolutions.

### Article 6.

Meetings shall be called by the president at such time and place as may be designated by the board of directors. There shall be at least one meeting of the Union each year.

### Article 7.

At any regularly called meeting, fifteen members shall constitute a quorum for the transaction of business, but a smaller number, not less than eight, shall have the power to adjourn to another date.

### Article 8.

This Constitution may be amended at any annual meeting by a two-thirds vote of active members present, provided notice of such amendment shall have been given in the call for the meeting, issued at least a month previous thereto.

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*As amended January 16, 1908.

### OFFICERS

| | |
|---|---|
| President, W. E. Perham | Niagara |
| Vice President, J. R. Reist | Mount Joy |
| Secretary, H. E. Van Norman | State College |
| Treasurer, W. D. Marshall | Lyndell |

### DIRECTORS

| | |
|---|---|
| M. P. Shoemaker | Greensburg |
| E. E. Jones | Harford |
| H. B. Richards | Easton |
| G. M. Carpenter | Wilkesbarre |
| D. R. Stephens | Sayre |
| Secretary, P. P. Gheen | Willow Grove |
| Representative on Executive Committee of Allied Agricultural Organization, L. B. Henson | Coatesville |

### SPECIAL LEGISLATIVE COMMITTEE

E. E. Jones, Harford. D. R. Stephens, Sayre. H. M. Stokes, Hanover.

### CERTIFIED MILK PRODUCERS' SECTION

| | |
|---|---|
| Chairman, H. B. Richards | Easton |
| Secretary, P. P. Geehn | Willow Grove |
| Bryn Clover Dairy | Malvern |
| Harvest Home Farm | Glenloch |
| F. E. Moore | Alfred |
| M. W. Palmer | Kingsley |
| Wawa Dairies | Wawa |
| Willow Brook Farm | Willow Grove |

### HARRISBURG, JAN. 26-29, 1909.

### EXHIBITS AND SCORES.

### CREAMERY BUTTER

| | | | | |
|---|---|---|---|---|
| W. H. McGranahan, Pittsburg | De Laval | Worcester | Hansen's | 92 |
| O. Blish, McCall's Ferry | De Laval | Worcester | W. R. | 90.5 |
| *L. H. Cooley, Burington | De Laval | Diamond | Hansen's | 94.5 |
| C. Y. Detweiler, Bellville | U. S. | Worcester | W. R. | 90 |

| | | | | |
|---|---|---|---|---|
| L. W. Keir, Nichols, N. Y. | De Laval | Colonial | Hansen's | 91 |
| J. C. Martin, Collamer | D " | Worcester | W. R. | 93.5 |
| A. H. Mathews, Newport | " | Ash | W. R. | 90.5 |
| Thomas Niering, Wopwallopen | " | Worcester | W. R. | 92.5 |
| *O. D. Mott, Edinburg | " | Worcester | W. R. | 94.5 |
| H. W. Saxton, Granville Summit | " | Worcester | W. R. | 91 |
| E. C. Wivel, Fulton House | " | Worcester | ....... | 91 |
| R. E. Williams, Mifflinburg | ...... | ...... | ...... | 92.0 |
| D. H. Meyers, Mifflinburg | De Laval | Colonial | W. R. | 90.0 |
| H. K. Stively, Quakerstown | " | Worcester | Hansen's | 93 |
| Guernsey Creamer, Guernsey | Sharples | Worcester | W. R. | 91 |
| New Era Creamery, New Era | De Laval | Worcester | W. R. | 91 |
| D. H. Davis, Meshoppen | " | Worcester | W. R. | 92.5 |
| S. F. Yost, Meyerstown | ...... | ...... | ...... | 94 |
| F. W. Reynolds, Mainsburg | ...... | ...... | ...... | 91 |
| J. W. Waite, Smethport | Sharples | Worcester | W. R. | 90.5 |

## DAIRY BUTTER

| | | | | |
|---|---|---|---|---|
| *J. A. Herr, Lancaster | U. S. | Worcester | Hansen's | 93 |
| E. E. Callahan, Wellsboro | ....... | ........... | W. R. | 90 |
| J. E. Dean, New Castle | ...... | ...... | ...... | 91 |
| R. J. Weld, Sugar Grove | De Laval | Colonial | W. R. | 91.5 |
| Austin Leonard, Troy | " | Worcester | Hansen's | 91.5 |
| B. F. Gabler, Greensboro | " | Ash | W. R. | 92.0 |

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*Silver cup won by highest score in each class.

| | | | | |
|---|---|---|---|---|
| B. F. Gabler, Greensboro | " | Ash | W. R. | 92.0 |

## CERTIFIED MILK

| | |
|---|---|
| Willow Brook Farm, Willow Grove | 96.5 |
| M. W. Palmer, Kingsley | 95.5 |
| Bryn Clover Dairy, Malvern | 91.0 |

## MARKET MILK

| | |
|---|---|
| Pencoyd Farm, Bala | 97 |
| M. P. Shoemaker Bros., Greensburg | 95 |
| Penshurst Farm, Narberth | 92 |
| E. S. Risser, Palmyra | 90 |
| Meadow Brook Farm, Jeannette | 93 |
| F. M. Fasset, Canton | 91 |

Note—WR—Wells-Richardson.

# Joint Meeting of the Penna. Live Stock Breeders' and the Penna. Dairy Union

## Proceedings of the Live Stock Breeders' Association

### Breeders' Assocnation.

President Norton—If there are no further questions, I wish to appoint the following committees for the Breeders' Association:

Auditing Committee—Joshua Sharpless and James Blair.

Nominating Committee—W. G. Powell, M. N. Clark, and R. L. Munce.

Committee on Resolutions—Prof. H. E. Van Norman, Dr. Carl W. Gay, and J. E. Dodge.

We will have a banquet tonight at the Lochiel Hotel, which I trust the members of the Breeders' Association and the Dairy Union will bear in mind. We want you all to take an interest in it, and to be on hand.

The next thing on the program will be a talk on "Profit in Market Hogs," by J. E. Dodge. I have the pleasure of introducing to you Mr. Dodge.

# PROFIT IN MARKET HOGS

### By J. E. Dodge, Narberth, Pa.

Ladies and Gentlemen: I fear you may be disappointed in what I will say, as I am not a public speaker, having devoted too much time to feeding, breeding, and handling the hog and dairy cow to increase their productiveness to practice speaking. Profit in market hogs depends on so many things that I hesitate to tell you what little I know, as many here probably consider the profit in pork-making as a delusion and a snare, especially with eight-cent hogs and seventy-five-cent corn. If I were to say in a few words how to make a profit from market hogs, I would say: better hogs, cheaper feed, and better care. Many hogs and some breeders have been nearly ruined by close confinement and excessive corn feeding. To make a profit we must have first-class hogs, and warm, comfortable quarters for them; neither need be expensive. I prefer the separate lot and small portable pen. These individual houses cost but little, are comfortable, and give the sows and pigs room enough for plenty of exercise, and the lots can be utilized in turn, to grow clover, rape and other green feed. By having a separate place to fatten the hogs in you have ideal conditions—the exercise and green feed for developing bone, muscle and frame, and the less roomy pen where the hog will eat, lie down and grow fat.

The day of the slow-maturing hog that took two years to grow and fatten is past. In his place is the early maturing hog, that develops young and lays on fat at an early age; one that will go to the butcher at six to nine months, weighing 200 to 300 pounds, for the Philadelphia market. An even smaller hog, weighing 140 to 175 pounds, tops the market. These can be turned off at five or six months. To get the right kind of a hog, if you do not want to breed pure-breds (although I think this is advisable, as good, registered stock can be secured at reasonable prices) we should use a boar from one of the registered breeds, crossing him on the native or scrub sow. Select a boar from the breed you consider comes the nearest to fulfilling the requirements of a market hog, and stick to boars of that breed; do not use a Berkshire this year, a Poland-China next, and some other breed next, or you will soon have the worst kind of scrubs. Do not make the mistake of keeping young sows each year for breeders. When you secure good ones keep them as long as they will produce good litters. Breeding constantly from immature animals will lower the vitality, and lessen the feeding qualities. When you have secured the proper type of hogs, if you give them good care, shade, clean sleeping quarters, clean water in the summer, and clean, dry sleeping quarters in the winter, you will find that there is none of our domestic animals that will pay better for care and feed than the hog. Feeding all corn to hogs is not the way to make pork raising profitable. There is on nearly every farm some field or fields that are practically useless; give them over to the hog, and see how soon he will clean them up and fertilize them, so good crops can be grown. How many utilize the garbage from the house, the waste from the garden, orchard, etc.? And yet here is a valuable asset in pig feeding. This will keep one or more brood sows, and go quite a long way towards raising a litter.

A good brood sow will raise two litters a year; the summer litter can be grown largely on grass, rape, cabbage, and other green feed. The winter litter on clover, alfalfa, and garbage. Supplement these rations with a little corn-meal, middlings, tankage, skim milk, or cracklings. These feeds will grow a large, strong frame, and as the pig reaches the fattening age, increase the corn-meal and he will quickly be ready for market, and you will have utilized many things that would otherwise go to waste, and made some profit.

Pennsylvania farmers need to watch with care the fertility of the soil, as on this depends their success as farmers. There is no better way to increase the fertility than feeding the crops to live stock. We can grow as much corn and other grains per acre as any state in the Union, and if every farmer will feed his crops to hogs and other live stock, buying, as needed, other feeds, he will find a high-priced market for his grains, and each year increase the fertility of the soil, and so grow bigger crops. I know that in the West they give over whole fields of grass and corn to the hogs, and in the South, fields of corn, peas, and other crops, to save labor of harvesting; but that method seems wasteful to us here.

I would like to see on every farm in Pennsylvania, one or more brood sows kept; and if the farmers will do this they will, I am sure, bless the hog, as a scavenger and a money-maker.

President Norton—Any questions?

Mr. Rodgers—I would like to ask if you like linseed oil to feed them?

Mr. Dodge—Yes, sir.

A Member—Would you have a sow produce her first litter before she is a year old?

Mr. Dodge—As I said before, beyond doubt breeding from too young sows will in time produce inferior hogs, lacking constitution. You will find the second, third, or fourth litter stronger.

A Member—I don't know about that; I have seen sows less than a year old produce as good litters the first time as those that came after. Some of them seem to possess more vitality than those three or four years old.

Mr. Dodge—Well, a sow well grown will naturally mature at one year. They will grow 75 per cent to 90 per cent of their weight at the end of the year.

Mr. Clark—There has been a question raised in reference to the high price of feed. Now, is it not a fact that there is more profit in feeding them during the summer on grass?

Mr. Dodge—There is profit in that, and I prefer it to anything else.

A Member—How about silage? Have you ever fed that?

Mr. Dodge—I have never fed that; the hog is not the same as the cow, and I do not consider silage a profitable food.

Mrs. Betts—I would like to ask these men who are dealing in stock, if they do not find in breeding pure-bred stock that the introduction of a new element is necessary occasionally? In breeding from generation to generation along a certain line, is not a standpoint sometimes reached where in order to keep the stock at its best it is necessary to introduce new blood?

Mr. Dodge—In breeding from generation to generation along certain lines—I think this question is well illustrated in the Jersey cow. In the little Isle of Jersey, five miles wide by ten miles long, they have bred for five hundred years along the same line, and have simply increased their standard until the Jersey cow stands today for the highest type of excellence.

A Member—Do you recommend alfalfa or clover as a winter feed, and, if so, how would you prepare it for the young hog?

Mr. Dodge—In the winter I would cut it up and steam it, and you will be surprised at the amount of clover and alfalfa hay they will eat. I have tried for several years bedding our hogs on clover hay, and at the end of three or four days there is not a bit left. We get better results by it.

A Member—What do you feed?

Mr. Dodge—Cornmeal, middlings, bran, and a little tankage.

Mr. Herr—What average increase in weight can you reasonably expect from young hogs on a ration of this kind?

Mr. Dodge—Well, I don't know that I can tell you, but I like to have them weigh 300 pounds at from seven to nine months.

Mr. Rodgers—Clean meat?

Mr. Dodge—Live hog, or better than that; but that is a fair hog.

A Member—How long do you consider it profitable to feed skim milk to hogs?

Mr. Dodge—We feed it as long as we find it profitable; that is a question that the condition of the hog must decide.

A Member—What is it worth?

Mr. Dodge—Skim milk mixed with corn meal is good for fattening hogs.

Mr. Rodgers—Can you tell the difference in the meat of certain breeds of hogs?

Mr. Dodge—I don't think I could, but the head buyer for Swift in Chicago says there is one breed that has more bacon to it.

Mr. Bayard—What breed is that?

Mr. Dodge—The Berkshire.

Mr. Taylor—I would like to ask which is considered the most profitable hog feed —meal or hominy?

Mr. Dodge—I don't know that I can answer that question. It is any material you can grow yourself. If you can sell your corn to your own live stock, you not only make a good market for your corn, but you fertilize the farm as well.

President Norton—In answer to Mr. Taylor I would say that I have fed hundreds of tons of hominy, and it is a good feed, but I prefer linseed meal as a fattener.

Mr. Taylor—I have also fed meal, but my neighbors have been feeding hominy.

A Member—What weight do you consider it most profitable to sell your hogs —150 or 175 pounds?

Mr. Dodge—150 pounds, when the market is favorable to that weight; the nearer you can get to the market, the better.

Mr. Bayard—Why is it that such a large proportion of our hog receipts consists of red hogs?

Mr. Dodge—I cannot answer that question except by saying that it must be because the red hog breeders are shrewd enough to sell a larger proportion of their stock than other breeders.

Mr. Bayard—The killer says he likes the Berkshire best, but the fact is, that one-half the hogs that come into Pittsburg are red.

Mr. Dodge—I think that comes about probably through this reason: the average farmer thinks he has to have new blood every year; he breeds Poland-Chinas this year, and Berkshires next. Once you find the right type, stick to it, and do not mix your breeds.

Mr. Bayard—Probably the reason for red hogs is that farmers have an idea that they bring the biggest litters.

Mr. Dodge—Some people want twelve or fifteen, while some are satisfied with five or ten.

Mr. McCreary—Do you feed rye with your skim milk? I think it is the best feed there is.

Mr. Dodge—I have never grown it.

Mr. McCreary—Well, now, you take that rye and chop it and mix it with skim milk, and you will see the effects; I have them weigh 160 pounds at four months old, and feed them on rye and skim milk after they are weaned.

Mr. Dodge—That shows for itself.

Mr. Munce—I find that the Western people are running very largely into red hogs now. But there is one thing that cannot be too strongly impressed on the American farmer, and that is to find the one thing that he wants, and then stick to it; start right, and keep at it. Our great fault has been, all over this country, that in horses, cows, and everything else, we do too much experimenting. If you are breeding hogs, breed either Berkshires, or Jersey Reds, or what you please, but don't try to breed a mixture of the three or more. I have been breeding Chester Whites for thirty-five years and if I live thirty-five years longer, I still expect to be breeding Chester Whites. Another fault of the average American farmer is the breeding from immature dams. This idea of introducing a new element continually is, I think, a mistake. My ancestors, as far back as I can trace them, were white men, and I want to be always white when it comes to my descendants, and the same thing holds good in breeding live stock.

President Norton—Secretary Critchfield would like to make an announcement at this time.

Secretary Critchfield—I want to say for the benefit of members of the State Board of Agriculture, that the Auditor General's Department is insisting that all bills for expenses must be attested by affidavit of the parties. So, on the vouchers we are to send you for expenses, you will find a blank affidavit. You will go before a Notary Public and make oath to that bill, and then charge in the bill whatever it costs—25 cents, or whatever it is. Some of you who have just come upon the Board may not know that all hotel bills are asked for by the Auditing Department, so, in order to be reimbursed for your expenditures, see that you have the proper receipts duly attested.

Mr. Herr—That does not mean railroad fares?

Secretary Critchfield—No; the Auditor General has decided that in paying your railroad fares, you state the number of miles traveled, and put down the amount paid.

President Norton—The question has been asked what time the banquet will be held. It will be held at half past eight o'clock. Prof. Van Norman, Mr. Gabler, and Mr. Brown, and Mr. Palmer and Mr. Lantz are the committee; they will see you, or you can secure the tickets from them.

We have had photographs taken of the corn show, which can be had for 50 cents, in the next room.

Next we will be addressed by Dr. William Hill, of the University of Chicago, on the subject of "Agricultural Guild." I have the pleasure of introducing Dr. Hill.

Dr. Hill's address was as follows:

# AGRICULTURAL GUILD

### By Dr. William Hill

Mr. Chairman, Ladies and Gentlemen:—When Mr. Critchfield asked me to come over here to Pennsylvania and tell you about the educational work for Agriculture that we have started in Chicago, I told him I would do so, but that I should expect to get infinitely more from the enterprising farmers and teachers of Pennsylvania than I was able to give. I have been at your sessions of yesterday and this morning, and in every one of them I have been more than gratified, and have found that their contribution to my enlightenment is vastly greater than I can hope, by my contribution, to add to yours.

One of the things that impressed me particularly, was what Dr. Hunt said before he began to talk, and I shall follow his example, and say a few words on the last topic before I begin to talk.

The last remarks made by the speaker, and the speaker on the floor, in reference to the necessity of taking some line of work, and then sticking to it, is one of the features to be preached to the American people today. It is the one thing I have emphasized in my class work at the Chicago University for the past ten years. Why do we go to Europe for our cattle and horses? Simply because the American has not been a continuous performer. It is horses this year, cattle next year; Percherons, then Trotters; Shorthorns today, Herefords tomorrow—a hotch-potch that nobody wants, and we are going outside, and putting millions of good dollars every year into those countries, where son follows father along a certain line and gets results. If we want to get results in America, we must follow their example, and breed either Percherons or Belgians, either Jerseys or Holsteins, either the Trotter or the Coach horse.

Set your standard high; determine to make it the best that can be made, and then try to reach it. Teach your son to love the stock and follow you; go to the city market and study the best there is there; show your neighbors the way, and do something that will help you and help them. With set ideals, with a definite determination to do the best you can, there can be no question about the results. The trouble here in America has been that we have found this policy too hard. We have been trying to make something that the other fellow has not got—something that would give us the advantage; so we have failed both ways. At the old Quaker Sunday-school that I attended when I was a boy, I learned a text: "He that saveth his life shall lose it; he that loseth his life for My sake will find it."

I don't intend to preach a sermon this morning; simply want to apply it. When we go out and try to get something for nothing—when we chase the dollar so hard that we forget the quality of our work, instead of getting the dollar we are chasing, we lose it. We lose our life when we are trying to save it. We think only of the dollar, and how to make it, and allow our work to become careless, and we lose both. When a man says, "I am going to do good work; I am going to do the best I can; I am going to work at something that should be done, and do it well," the pay will come. That has been my observation. It is one of the most important economic principles I was able to develop at Harvard and later in teaching Economics, but even better than college teaching is the teaching that I have gotten on the farm, working out this principle. I have been on the farm, working out these things for the dollar, and also for the results, and from my experience I can say that the man who will set a high standard, and do the work the best that it can be done, is more likely to get good results and profits, than the man who goes out to get profits and neglects the quality of his work.

Now, there is another thing I want to say before I begin, and that is: I cannot boast of Pennsylvania Dutch ancestry, but I can trace back to Pennsylvania Quaker ancestry for about two hundred years.

Secretary Critchfield—We are proud of both lines.

Now, I will begin. The Agricultural Guild was organized about a year ago at the University of Chicago. It is simply an attempt to co-ordinate the forces now at work for Agricultural education and betterment. The great development of this nation for the last half century, and particularly within the last ten years, has come about through a better organization of the educational forces. The business methods which have been applied in the building of large railroads, starting with little lines, disconnected lines, joined together to make better service possible, have not been applied to agriculture. Eleven lines were joined together to make the New York Central lines, and thousands of smaller lines all over the country united to make a better service possible and they lowered freight rates from three cents per ton mile—to three-fourths cents per ton mile—a combination and organization which was productive of great good to manufacturers, and eliminated the enormous freight rates due to competition. I am not here to talk about combinations, but I will say just one word about that great American problem—not the greatest. We have spent much energy in attacking that problem in the wrong way. We have tried to stop it and prevent combination. We have tried to maintain the old, individual competitive system, the day of which has passed. We will never again see the day of individual competition. The day of the combination has come to stay, but it will not be the day of unrestrained combination. We should be prepared to renounce this individuality, and not to commence the attempt to restrain this natural tendency, which, thoroughly controlled, will bring about beneficial results. What must be done is what our President and some of his advisers have been trying for several years to do—with partial success—to so control these combinations that they will not only make a few successful promoters rich beyond the dreams of avarice, but be successfully distributed among all the members of the community whose co-operation is necessary to produce the results.

Now, coming again to my text, studying these principles, and teaching railway. banking, and other forms of them in the University of Chicago, and, of course, Economics in Agriculture, led me to see the relation between Agriculture and other interests, and to see the difference in it. The farmer works as an individual, instead of having the benefits of combination, as do the railroads, the factories, the bankers, who see more clearly the necessity of this. In the whole scheme of things the farmer has the least protection. The land is the foundation on which all the great superstructure that has been built up in America rests. And because the natural conditions were so favorable to agriculture, and our resources so rich, it has been possible for the farmer to produce easily under conditions that would have driven the business man into combination long ago. He has been able to produce under the old individual system; although the daily tendency has been toward combination instead of competition, the farmer has been allowed to do as he pleased, and continue the system of individual competition. They only work together to serve their own interests. Our neighbor over here breeds Chester Whites, and is successful; this makes his neighbor a little jealous, and, in order to be looked upon as a leader, he takes to breeding Berkshires. What is the result? People who come in from the outside get in some instances Chester Whites, while others get Berkshires; the same thing holds true in cattle, and in horses. Now, when a man wants to buy Jersey cattle, or horses of a certain kind, or anything of a particular breed, where does he go? He goes into the neighborhood where these things are bred, rather than to some individual breeder. This is well illustrated in Wisconsin, where farmers have been breeding a particular strain for two or three generations. You will find men there who have bred Holsteins, or Chester Whites, or Jerseys, or Percherons, or Belgians, for two or three generations, and they are successful; people know they will get what they want when they go into these neighborhoods where they have been bred.

The great thing about Agricultural Colleges is the co-operation and co-ordination of the existing agricultural forces, and that is our plan in forming the Guild—to use co-operation and co-ordination of the forces already existing. Now, what does the University furnish; what does the farm owner furnish, and what does the student furnish? It is the co-operation and co-ordination of these three forces, and, I might add a fourth, which is more important than any of them, and that is the Agricultural Colleges, the men who are leading the way to agricultural education. That is the Guild, and the combination on which it rests. It is not undertaken to duplicate the work which the Agricultural Colleges and the other interests are doing, but to supplement them.

A number of wealthy, successful business men of Chicago have bought farms outside the city, as the tendency of the day is. Some of them were men who had grown up on the farm but had not lived on it. They had been driven from the farm by the natural tendency which has prevailed during the last forty years. What were these forces that tended to drive men from the farm? What is the economic reason which has changed the American people from 95 per cent rural fifty years ago to 50 per cent rural today? Why are all the people today in Russia and China living on the land? Why are practically all the people in Mississippi living on the land? Simply because the economic efficiency or productive capacity of the individual is low. When one person can produce only enough to feed himself, there is no possibility of artistic and literary development or any development which makes for the cultured side of life. In the hard, pioneer conditions, when we were struggling to feed ourselves, our farms on the stony low lands of New England and of Pennsylvania, New York and Ohio produced practically all, and the energy of the people was necessarily directed to the production of food enough to supply the necessaries of life. With the opening of the pioneer prairies of the West,

came the invention of farm machinery, and better plows and harrows and harvesters took the place of the cradle and the sickle and the scythe, and all of that farm machinery is the product of inventive American brains; and the ingenuity of the American inventors has been largely increased by the growing demands of the farmer for more and better machinery; all this has made it possible for the farmer to have many things that were formerly denied him—possible for him to make use of the artistic and luxurious development of the last half century.

The economic cause of the movement of the State from agriculture to industry, is the increasing efficiency of American farm labor through machinery, and through better land on which to apply this labor. Today, one man feeds not two or three, as he did in pioneer days, and as he does today in Russia, India, China, and Mississippi, but he feeds a hundred. The teeming thousands of New York and Chicago, the teeming centers of America, and of the old world, are largely fed by our American farmer. So it is perfectly natural that we should have people moving from the country to the city.

In the economic movement from the country to the city, what elements are most likely to shift? Is it the bright and efficient labor that passes from the old industry to the new, or is it the man who is less active, more satisfied with existing conditions, more ready to do what he is doing, and what his father did? I need not answer that question. The energy and brains and efficient leadership of the last half century have been centered in the cities; they have built our railroads and established our commerce, established our cities, and made the United States occupy the position it holds today, the leading nation of the world. And the farms are the superstructure on which this nation is built; they are the foundation upon which all this energy and power which makes for the leadership of the world rests. But in what condition has that movement out of agriculture left agriculture? What has been the status of the farm? One often hears it said that the farm is a good place to be born, and to grow up on if you get away soon enough. Today the business man who has had all the success the business world can give is beginning to say that the farm is a good place to return to, and the sooner he can get back to the farm the better. One of the successful men — a member of our Agricultural Guild—said to me (I had been spending the day with him most pleasantly at his beautiful farm, among his fine Guernsey cattle) "I count every day lost that I must go into the city." The conditions under which a man can live, under which his children can grow up, the contact with Nature, and the absence of all the artificial, that goes best with city life, makes it natural that any sane man who has seen all the attractions that city life can give should long to return to the simpler and more wholesome conditions of the country. This tendency to return to the country is very strong today. It is necessary to understand these forces to see how the Guild developed.

A number of these men who have gone from the farm, and have made a success in the city, have now decided that they will make their homes in the country, and there spend their declining days where their children can grow up on the farms about Chicago. Many of them expected to apply the business methods which brought the success in building railroads, or banking, or commercial life, to these farms. What difficulties did they encounter, these men who have moved from the city to the country? First, the serious dearth of good dairymen, men capable of taking charge of their herds of fine cattle, and of men capable of carrying out the orders such men give. If a man of this kind wanted to build a railroad he could hire men to carry out his orders and construct according to his plans. Where can you find such a man in agriculture? What proportion of education is necessary to equip a man so that he will be competent to perform these duties? Do our agricultural colleges educate a man for this? Many of these men have had agricultural college graduates on their farms to take charge of some of the departments on these farms. With what results? In most cases, with disastrous results — in some cases extremely disastrous. One of these men a year before the Guild was organized went to the leading agricultural colleges of the West for a man to take charge of his high-class dairy and farm. A graduate was recommended to him who was said to be the best in his class, and, in addition to that, had had a considerable amount of practical training. This man was employed at a good salary and given charge of the farm. A practical man, with little college training, had given up the position because of the illness of his father. When he left the herd of one hundred cows was producing, on an average, about eighteen pounds of milk per day. Records were kept, and the herd was in good condition. This college graduate had charge of the herd a little less than three months. At the end of that period the average production was eleven pounds per day. When he left, the records were in such shape that nothing could be told about the condition of the farm, and, worse even than that, from a moral standpoint, bills amounting to eighteen hundred dollars, which had been supposed to have been paid from month to month, had been covered up to make a showing. A carload of cattle, which this man had been sent to a neighboring city to select, had been bought at a very high price, and at the end of a year's time only three of them proved to be worth anything — worth keeping in the herd. Of course, this is an extreme case of the inefficiency and dishonesty of a college graduate. I would not take it as a typical case, but a number of instances, not so striking, followed from placing in responsible positions university men, making it difficult to get any man who had been operating a farm by proxy to want to get college men.

That was the status I found when we organized the Guild. One thing I have learned at our colleges: that the men who have had all this theoretical training which the colleges afford, when they have gone into positions for which they have been recommended, have failed so dismally that we have decided not to recommend for positions of responsibility any of our graduates, until they have had a reasonable amount of practical training and experience. It was to secure this practical experience that the Guild was organized. It was to give these men, college men and others, an opportunity to fit themselves for the management of others' farms, or possibly their own, that this work of the Guild was undertaken.

We cover two sides of need: the need of the student to have the opportunity to get this practical training to fit him for the responsibility to be placed upon him, and the need of the farmer, whom either lack of knowledge of agricultural conditions, or pressure of other business, prevents from taking charge of his own farm. So, when some of these men and their neighbors came to me and said, "What can you do to help us; what can you suggest?" I gave them the results of my own experience. I grew up on the farm. I had never been away from the farm until I went to college; when I finished college, I went to teaching agriculture along with these other economic subjects, and at the same time had charge of the old farm of five hundred acres. I had the same kind of experience as those I have just told you. I had, in a number of instances, taken men who wanted to learn how to farm, to do the work on my farm, under my own supervision, but after a year or so, when a man had become competent to take charge of the work, he would want more money than the proceeds of my farm enabled me to pay, and he went to one of the agriculturists who could pay more. I probably do not need to define to this audience the difference between an agriculturist and a farmer; the agriculturist is the man who makes his money in town and spends it in the country, while the farmer is the man who makes his money in the country, and spends it in town. From my own experience, I had decided to do some experimenting, and secure a young man who had some college training, and eight or ten years' practical experience, to take charge of my farm; and after talking the matter over with these gentlemen, I decided to let my farm be used for the purpose of training young men, so that after they had the theoretical part they could get two or three years' practical experience on the farm, under proper guidance, and then, when they were competent to take positions of trust, positions would be found for them. It was simply trying to do systematically what we had been doing unsystematically. I suggested to these men that if they would allow their farms to be used for this training they would receive benefits, as well as the students, because it was so hard to get reliable laborers for their farms. Ten farm owners, whose farms were near together, about Chicago, undertook each a specialty in some particular line. The University was to get them expert advice from the agricultural colleges and successful farmers, as to what lines should be undertaken on each farm, due to the relative condition of the farm. A superintendent was put in charge of each farm. The requirements were: His practical ability to make that farm a prosperous farm. I put that first, because I have observed the methods of educational men in their business training. Second, a theoretical, scientific and technical training, which would enable him to plan the work on that farm and conduct it in such a way that every man who was working under him would have the advantages he could get from doing the work in the right way. We learn how to do by doing. Third, business sense and judgment. That, perhaps, would be a subhead under the first practical requirement, which was making a prosperous farm. You will find men who can grow good crops, but do not know how to market them. Then, another important requirement is enthusiasm, and love of the work they are doing, and effort to inspire the men who are working under them with this love of the work, so that the whole organization would move them to good spirit and eagerness to accomplish the best results.

You will readily recognize that such a combination is rare, and that you cannot find every day men who combine these qualities, and I frankly and sorrowfully confess that we have not as yet found a man who can anything like come up to these requirements—but that is what we are trying to do and to train men for.

Numerous applications came in. We selected a number of men and started them to work on the different farms we had in the meantime secured. Some of these men had the idea that a good many college graduates have, and perhaps a good many more graduates of non-agricultural colleges have than of agricultural colleges—that their education fitted them to tell other people what to do, instead of doing it themselves, but, upon their application, I impressed upon them by numerous letters this first condition, this first requirement: "You will begin at the bottom, and do the hardest and most disagreeable work of the farm, for two reasons: first, to see that you really can do it; and second, to see as to your staying qualities—to see if you really want to do farming, and the hard disagreeable duties of farm life. If you can't, we can't afford to put up with you; we are selecting the men who have practically decided that the practical in agriculture is more to their liking than teaching in an agricultural college, or professional or commercial pursuits open to them. I really think that any man who has carefully considered the opportunities, and then decides that he wants to make this his life work, if he wants to make farming his life work, gets more opportunities for development, good health and pleasure than he could win in any other walk of life, or in any one of the many openings that are offered everywhere in America. I don't mean that he will become actually wealthy, but he will be sure of a good living, and, to a great extent, of a good home, and a good, wholesome, healthy life. What are your children going to be if they grow up in the slums of the city? If you are really in earnest and want to enter our work, I will give you two years to prove it in."

Immediately after our plan was advertised, I received a letter from Minnesota, from a young business man, who said he had graduated at Yale five years before; he had enough money to buy a farm, and was offered the management of a large ranch, but before buying a farm, or undertaking the management of another man's farm, he wanted to qualify himself to do the work intelligently. He knew nothing about it whatever. We have generally taken the view that any one is able to run a farm; men have gone into this work without anything like the training that would be required in any other work. Everybody knows the training that is required of engineers and professional men, but we have not thought it necessary for farming. This man was a college graduate, and he knew if he wanted to go into farming he must get a wider experience than he had. I did not encourage him to come; I told him he would have to do the hardest and most disagreeable work on the farm. This did not discourage him, and he came down from Minneapolis to see me and I emphasized it even more strongly. That did not deter him; he came, and put in his time, one-half of each day in putting the books into excellent shape, and the other half he learned how to plow and do all the other things that the successful farmer must do in order to accomplish anything. He worked through the summer, and then we advised him to take a technical training in one of our agricultural colleges; he is there now, and by next spring expects to be ready to take a position. That man was getting several thousand dollars a year salary, and is now prepared to be one of the best kind of farm managers.

Another instance: A young man who was receiving a good salary from one of the large automobile companies wrote me. I told him what I had told the other man, but he was not discouraged. He came to Chicago to see me from Cleveland. He had never been on a farm, but was determined to get on the farm. He had followed his father in the shops, and had watched the effect. His father was getting several thousand dollars, and he, himself, had been there eight years and was getting eighteen hundred dollars. I said to him, "The profession in which you now are offers greater opportunities than you will have in farm work; at your age (he was then 28) you have an excellent start, and you will not make in farming anything like the amount you are now getting." He said, "I can live on the farm without that much." I reminded him of the hard and disagreeable work he would have to do on the farm. He went home and thought the matter over, and then decided to come. He resigned his position with this company, which sent him all over the country to design new parts for automobiles. Here was one of the suggestive things he said to me: he said, "They are always hurrying me; we are always under pressure, and I never have time to get things out." He said he had to hurry and get things out for this year, and then go ahead and make changes, so as to make people want to buy new machines next year." This young man was an artist, and had the artist's sense of work. He said: "I want to do something, where I can do something worth while, and do it well, and I am now going to see whether horticulture and poultry won't give me a comfortable living. I am investing my own money, which I have saved, and I want to make the experiment." When he came to resign his position, the company was so anxious to keep him that they offered him three thousand dollars a year. He was not one of the discards of the manufacturing world, but was offered three times the salary the average farmer makes in a year. I told him that unless he was unusually successful in farming he could never hope to make the same amount in farming. That made no difference; he was determined to try it for at least a year, and then, he said, he would have the satisfaction of either knowing that he could do it, or that he must go back to the shop.

These are two practical illustrations of the class of city men that come to us. Now, about college men. We had ten graduates of the best agricultural colleges in the country in the Guild the first year. Three of them fell off quickly. One of them, it seems, had been on the farm, and knew how to do farm work, but was not willing to do it, and wanted to tell us how to run the farm. There were plenty of things to criticise on these farms; there always are. He was always criticising, and wanting to get a responsible position at once; so we let him go. Two others fell by the way because they had not the physical strength to farm or willingness to do the work mapped out. The other men, five of whom had farm experience, had grown up on good farms, and then had a college training, went to work at the bottom, at twenty-five dollars a month. Within a month they were advanced to thirty, and worked for that for two or three months, advancing from time to time, until today those men, with only six months' training in the Guild, are in positions that give them opportunity for growth and development, and they are getting very comfortable salaries. We expect to pay all a man is worth, but we distinctly emphasize the quality of the work, rather than the pay for it. I say to these young men, "You can get more money by teaching, or going on the farm of some wealthy man who does not know how much your services are worth to him, but you will not get the practical experience; if you want to get into contact with the best men, and are determined to go into Agriculture, we have the best inducement to offer. If your business associations are such that you want to take up this work, we want your energy and time and your brains, to help us to elevate the status of Agriculture."

Mr. Van Norman—I move we adjourn.

Mr. Bayard—Don't forget the banquet this evening, at nine o'clock. This is as early as they can get the dining room ready for us. Tickets are $1.50. Last year and the year before the banquet was one of the best features of our convention, and we want to make this just as good. There will be some good toasts, and other good things. Get your tickets at once, so that we may know just how many to provide for.

President Norton—I would like to appoint a committee to consult with William J. Rose, Division Freight Agent of the Pennsylvania Railroad, in reference to the shipment of horses and stock to the fairs. I will appoint on this committee: Dr. Carl W. Gay, Mr. F. W. McCoy, Mr. James Blair, Mr. J. E. Dodge, Mr. J. W. Oakey, Mr. Henry Fielden and Mr. W. W. Blake Arkcoll. They will take charge of the matter, and report tomorrow morning.

Prof. Hamilton—I want to emphasize the point made by Dr. Hill. I tell you that in agriculture, as in everything else, practical education is essential. I am appealed to time after time by men in position to employ managers, and they say, "Where can I find a man who can take charge of my farm and not break me up?" Our agricultural colleges do not yet turn out such men. A man came to me and said, "Where can I find a manager for my fine estate, and a hundred fine cows?" I told him of a young man whose name had been mentioned to me, who knows the theories all right, is a graduate of an agricultural college, but whether he will get up at half past four any morning, and put his men to work, or whether he has business capacity to sell the products of the farm, I don't know; or whether he is able to manage men, or direct them in the practical management of the farm, I don't know, and nobody knows; the young man himself did not know. That is the risk one is running. He employed him and the young man failed.

Another man came to me some time ago, who owns a farm of over nine hundred acres, and over a hundred fine Jersey cattle—everything to make an ideal place, and he said, "I feel like selling everything I've got and getting away. I can't get a manager for my farm. Early in the morning there will come a knock at my door, and there will be the manager, who says, 'The gasoline engine won't work, what shall I do?' and then I have to get up and go down and fix it. The next day he says 'The cow, Daisy is sick; I wish you would come down and look at her.' " He was undertaking to manage the farm but didn't know how. He was like an engineer who knows enough to open the valve, but not enough to run the engine, and when anything goes wrong he calls out the passengers and says "What do you think is the matter, anyhow?" When you get a manager you want one who knows how to do everything from start to finish. When I first went to work at State College I expected to start in doing two or three hours' work in the afternoon, but the boss said to me "Clean out the cow stable." It had not been cleaned out during vacation, but I started in and cleaned it out. I want to say today that no agricultural college is an agricultural college unless it has from twenty-five to fifty farms—dairy farms, stock breeding farms, poultry farms, truck farms—every branch of farming—so that the young fellow can start out and get practical work, as well as theory. He is there two years, and has kept books to show what has been done by him, so that when a man comes and asks for a young man to manage his farm, you can say to him "Smith is the man you want." "How do you know?" "Here is his record, and he is worth all you can pay him." In this way you can be sure of not making a mistake when you recommend a young man as manager of a fine estate.

I hope our agricultural colleges will follow what has been undertaken by the University of Chicago, and establish farms on which the young men shall go and get practical training, as well as theoretical training in the class room.

My father graduated at Jefferson college, and afterwards studied medicine, but he never practiced it. When he came home he saw things were in such a condition that he had to stay home and take hold, but he said, "I was a man, and did not know the difference between a shoulder and a ham." Now, a man may have the theory of things, but unless he has actually done them with his hands he will find his theory of little avail. He must be practical, as well as theoretical. I was down in Virginia, a number of years ago, and was making a speech to a number of old farmers down near Culpepper, and they gathered round there, and at last, during the dinner hour, one of them said to me "Did you ever farm?" "Well," I said, "I have two or three farms up there in Pennsylvania." "Oh," he said, "that is not what I want to know; did you ever work at it with your hands?" And there was the point: was I competent to give advice? He knew that if I had not worked with my hands I could not do so—I was not competent to give advice anywhere. Now, that is what we want—men who can talk about the science of agriculture, and also make it profitable as a business.

President Norton—We will now stand adjourned until 1:30 this afternoon.

Thursday, January 28th, 1909.
1:30 P. M.

President Norton in the Chair.

The President—The first topic on the program this afternoon is "The Outlines of Breeding" by Prof. F. R. Marshall, of Ohio State University. Ladies and Gentlemen, I have the pleasure of introducing Prof. Marshall.

Prof. Marshall spoke as follows:

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## "THE PRINCIPLES OF BREEDING"

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### By Prof. F. R. Marshall, Ohio State University

It is a noteworthy fact that most of our successful breeders of live stock have had but little to say in regard to the principles that constituted the basis of their practice.

It is not true that the reticence of these masters in the art of breeding is due to any unwillingness to benefit others by

sharing their knowledge: it is impossible for them to impart by word of mouth the accumulated outcome of their experiences, and even should they do so, it would, to many of us, seem so commonplace as to be disappointing.

Because of the paucity and the seeming indirectness of expressions from those to whom we naturally turn for direction, the literature on the subject of breeding has practically all been written by persons who are students of the experience of those actively engaged in breeding. In these works the scientific has had little place; indeed, in all the books written previous to 1906, several chapters were devoted to reviews of claimed facts and ridiculous views, the absurdity of which is only accentuated by the lack of agreement among the theorists. These authors endeavored, from a study of the practice of breeding, to formulate a science of breeding, and they failed, because the operations of the laws of heredity, and the history of the reproductive cells, are too involved and too intricate to be intelligible to anyone whose contact with the subject has been limited to the practical side.

Progress is usually effected by a succession of extremes. We have viewed the effort to formulate a science of breeding from the practice of breeding. Now we have an effort to formulate a system for the practice of breeding from the science of the subject. Not only are we led to believe that breeding is becoming a science, but that it is to be an exact science.

The past eight years have been extraordinarily productive of discoveries and additions to the knowledge of biology. Heredity is less a sealed book than formerly. Occurrences in the plant and animal world, formerly impossible of satisfactory explanation, can now be accounted for. In some limited sense, predictions can be made as to the outcome of certain matings. In the exuberance over the partial insight that permits such explanations and predictions, it has been assumed that with the newly acquired knowledge the work of the practical breeder is to be revolutionized. Impatience has been manifested, because the breeders seemed so apathetic toward the possibilities of the application in practice of the findings of the laboratory.

Without going into detail, it may fairly be stated that an understanding of Mendelism, for example, while not permitting anything previously impossible, does add a degree of certainty, and facilitates endeavors to fix upon our animals new small characters, and may play a part in the future evolution of our breeds. Evolution, however, is not premeditated, and while recognizing the probability of further changes in our best types of the present, we, as breeders, must be less concerned about new characters and more interested in the matter of adding greater certainty to the outcome of the matings in our herds, and thereby bring the rank and file of our breeding animals nearer to the excellence of our champions.

In this work of general improvement the progress of the scientists is of great indirect service: the limitation of their service forces us back upon our own resources. We see clearly that there is to be no short cut to our goal, and that our advancement must be by more assiduous attention to those forces we have had with us, and which we have been prone to underestimate in our eagerness for the new and the startling.

I have spoken thus of the minor practical value of recent scientific developments mainly, because there is a considerable probability that beginning breeders, familiar with the literature of the day, may too lightly regard the seriousness of their calling, and also as a protest against any disposition to lightly esteem the astuteness of the breeding fraternity, or its past and present celebrities.

Any person really familiar with actual stock breeding, who will also make a full study of the theoretical side of the subject, will be amply repaid for so doing, by coming into possession of a greatly increased respect for the value of the information he previously possessed, and by the unvarying uniformity with which the findings of the scientist are corroborated in good breeding practice.

Our faith in, and practical appreciation of some of the tenets of breeding, may be increased and quickened by an examination of some well known but often overlooked facts. We continually speak of the blood of our animals, "Blood will tell" and "This one is rich in the blood of the winners," are expressions of a common kind. Doubtless the term "blood" expresses our idea that the essence, the life-giving principle of one animal, has been transferred to another. The actual tangible material that does really pass from generation to generation is really something that can be studied much more satisfactorily.

Every animal is the product of two microscopic bodies, one contributed by each parent. Because microscopic, the nature of these bodies is not commonly understood, and yet, within them, and them alone, are contained the contents of all that the new animal ever can, or will be, either individually, or as a breeder. In the male these small bodies—the spermatazoa—are produced in large numbers. The most interesting part of their development is in the stages immediately preceding their readiness for use. Whether we consider the spermatazoa of the male, or the eggs or ova of the female, we find the conditions similar. Each contains a small centre of activity, much in contrast to the rest of the body of which it forms a part. The contents of this centre of activity are present in still smaller bodies, the number of which never varies in the same kind of animal. The most accurate count obtainable shows that in their first form these male and female bodies, that produce a new animal, each contain in their active centres 16 of these more minute structures. It was said that the number of these bodies in all cells of animals never varies within a species. Evidently then, if the new animal is to start with its proper number of 16, a reduction must occur in the paternal bodies, prior to their union within the body of the dam. As an actual occurrence, both the male body, or spermatazoon, and the female body or egg lose some eight of the sixteen bodies we have cited, and thus the life of the progeny is inaugurated with the number normal to its kind, equally contributed to by sire and dam. There is good reason to believe that these eight contained bodies are the chief, if not the only part of the reproductive cell, that plays a part in heredity. So far as it can be determined, it is altogether a matter of chance, which eight of the sixteen bodies will find their way into the cell through which the parent contributes to the offspring.

Since this hereditary substance is of such complete importance, it is exceedingly interesting to know from whence it was derived by the parent. Manifestly the parent also must have received its supply in equal amounts from the grandparents. In the early stages of embryonic life, a portion of the same material that was contributed when the parents were mated, is set aside in the reproductive organs of the new animal, while the remainder goes on to control growth and development. This vital material, set aside in the reproductive organs, increases in amount, and in due time produces other bodies to originate new animals, but its make-up, or the qualities represented within it, is not more than very slightly, if at all, responsive to conditions affecting the body.

We have here the two vital, fundamental facts: first, An animal is formed from the same material that it transmits to its offspring; second, the hereditary substance is not materially affected by the manner of life affecting the body of the animal within which it happens, for the time being, to reside.

An animal is valuable as a breeder, in proportion to the qualities represented in these interesting bodies contained in the cell that it contributes to each offspring. We do not believe that one can materially change the make-up of those bodies, by anything we may do to the animal, in the way of care, feed, or training. We can judge of what they will contain, largely by studying the animal, because its body was formed under the control of part of this same material. This is commonplace individuality.

However, an animal may develop into what we regard as a good individual, because of the predominance, and mastery, of some superior and more powerful of these sixteen bodies, and yet, when his breeding time comes it may occur that of the sixteen, the greatest number of the eight separated out will represent the weaker and the inferior, and the good-looking animal is a failure as a breeder because his hereditary material is of a mixed character. Obviously then, individuality itself is not a sufficient guide. We must also arrange that our sire has had opportunity to receive hereditary material only from animals that were satisfactory breeders. We must select his ancestry; we must have his pedigree right. There may be an illustrious ancestor in the third line, but an inferior one in the same line has equal opportunity for representation in our selection.

It is imperative that we place equal emphasis on the chance for influence from equally remote ancestors. The appearance in a pedigree, of a cow that is the foundation of a family, is of no value, unless her qualities are especially noticeable in her descendants, to the exclusion of those of other cows in the same line. The grandam may have been a show cow, and incapable of reproducing her excellence, and therefore be a menace to the prospects for satisfaction in the offspring of our selection.

Again, sire and dam, in the turmoil of the showring, and the variability of judges, may each have been champion, and yet dissimilar in type and ancestry, and altogether unlikely to endow their progeny with the excellence of either parent, or even with blend or intermediate type, which he himself exhibits.

The selection of proper individuals, to represent the composite, uniform excellence of all the ancestors, is our only means of controlling heredity. It is highly improbable that one man can ever secure by purchase a considerable number of animals of similar breeding, and combining his idea of excellence in individuality and ancestry, and until he has such a group of females he will expect some unwelcome appearances, and many lots on which the buyer, and not himself, will do the pricing. Only by a succession of good breeding bulls and by rigid culling, can such an object be attained.

We have said that the hereditary material is not largely responsive to the environment of the animal. This in no way lessens the need of giving to each young thing the fullest opportunity to show what it is made of. Otherwise, one is selecting under a serious handicap, and the youngster which lacks power to develop the qualities which we are emphasizing, must be eliminated regardless of his ancestry.

Evidently the securing of a herd from which we are justly entitled to expect a majority of prizes, is not the work of a day, nor of a decade. It is not possible to fairly estimate the value of a herd successfully mated, and dispassionately culled for half a dozen generations, and to no one can they be as valuable or represent such opportunities for profit, as to their breeder.

Undoubtedly there has been in the past an unduly high regard for stock that had crossed the water, and yet, how often have we seen the imported bull that was not of show yard calibre, siring a line of stuff strikingly uniform in excellence, not because he was reared abroad, but because his ancestors had been conscientiously selected and culled for so long a time, that all undesirable possibilities were eliminated.

The same care and intelligence, similarly continued in America, produce the same result, and are equally appreciated by really discerning buyers. As an illustration of conscientious selection, allow me to refer to an incident that came to my attention some weeks ago. Mr. James Leask, the breeder and exhibitor of the 1907 champion steer and the reserve champion of 1908, was in need of a herd bull. After several months' search he decided to purchase one of two calves, both owned by the same breeder, and went to make his selection. He was forty-eight hours at the place before he came to a decision. In one particular instance I knew of, Mr. N. H. Gentry, of Berkshire fame, was deciding as to which one of his boars a certain sow should be bred. The choice lay between two boars, both of which he had raised and watched from birth, and the same was true of the sow; yet it was only after an hour's hard study that he indicated which lot the sow should be driven to. Such study and care gave Mr. Gentry a Longfellow and following him, boars of such an order that he was safe in using them in preference to the best he could procure elsewhere.

President Norton—Any questions on this paper? If there are none, we will proceed with the program.

President Norton: The next subject is "The Pennsylvania Stallion Law" by Dr. Carl W. Gay, but before we take that up, we will have the report of the Committee appointed last winter to look into the matter of "Hereditary Unsoundness," after which we will listen to Dr. Gay.

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## REPORT OF THE COMMITTEE ON HERDITARY UNSOUNDNESS

### Presented by Mr. Powell

Your Committee find that they have been given a very important question as to the stallion law. It has brought many serious difficulties.

As we all know, our Pennsylvania law was copied mainly from the law of Wisconsin, and I notice that within a comparatively few days another Western state has adopted about the same thing.

The serious defect in the law is the certificate required. The law says that the breeder or owner of the stallion shall furnish a certificate, signed by the Secretary or President of a registry association. Now, as a matter of fact, in many of the associations, the certificate is signed by the printer, in facsimile, and not by the President or Secretary, but I think our breeders very honorably considered such certificates as issued by the association.

Another serious defect in the law is in the classification. They issue certificates to full-bloods, cross-breds and grades. Now, full-blood means something. The cross-bred doesn't mean anything except a mongrel, with some goods to sell. It makes a vast difference, however, for what purpose a horse is bred. If you take a cross-bred horse, for instance, sired by a Percheron on a registered mare of Clyde or Shire, or any one of the recognized breeds, it would be all right, but if you use the draft horse upon the pony, though both may be registered, it would not be the same thing. In the one case you may have the value; in the other, the horse should not be recognized for breeding purposes. It is supposed, for instance, that you use a registered, recognized horse of the coach variety; that, crossed upon the road animal, we get the best kind of a valuable animal, although, if used for breeding purposes, you could use the same coach horse upon something else that the lines do not run parallel with—so that the law is very defective in that respect, so far as cross-breds go.

Then, again, when you get to grades. They may be practically full-blood, and by registered sires, but they must be known as grades. Some of them may be 31-32 full-blood, or even 63-64, and this is preferable to many registered animals; or the grade may be made up of a mongrel on a mongrel, so that, practically, the law is so defective in that respect that the breeder can only fall back on his own judgment.

Now, that is in reference to the law as it now stands, but your Committee was appointed more especially upon Hereditary Defects. My own practice in breeding is to keep far away from any form of unsoundness that may be transmitted, but, unfortunately, there are stallion owners who do not do so, and, as a Committee, we are placed in an embarrassing position. We are in position between justice to the breeder, and at the same time injustice to the stallion owner. We have tried to make a very conservative report based upon investigations and observations. I have learned that my colleague Dr. Marshall, of Philadelphia, has recently delivered an address before an association in New York on this subject, and, on getting a copy of this address, I find he has pretty well covered this question, so I got his consent to read his lecture on this occasion. No doubt, you will want to ask a good many questions, and, so far as I can tell, the Doctor will be very glad to answer them. I shall ask Dr. Marshall to come forward and read his address on that subject. It happens to strike this question very fully and sufficiently.

President Norton—I have the pleasure of introducing Dr. C. J. Marshall, a member of the Live Stock Sanitary Board of Pennsylvania.

Dr. Marshall's paper follows:

# HEREDITARY OR TRANSMISSIBLE DISEASES IN HORSES

### By Dr. C. J. Marshall

Certain defects in animals are known to be transmissible, while others are so considered for the want of a better explanation. Tuberculosis was believed to be hereditary for centuries but the searchlight of modern science has shown that this factor plays an insignificant part. The future will reveal the true cause of other diseases.

Governments and a number of states have adopted stallion registration laws for the purpose of improving type and soundness and to assist and encourage the breeding of better horses. In most cases the law attempts to prevent the use of horses that are off type or have hereditary or transmissible unsoundness, or are afflicted with contagious or infectious diseases. Very few authorities state definitely what such defects are. Veterinarians often experience difficulty in passing judgment upon stallions for which licenses are requested and are frequently criticised for condemning or passing them as serviceably sound for the stud. At horse shows and fairs similar questions arise. Some may be afraid to exhibit valuable sires for fear that an unknown or abnormal condition might, unjustly, be considered hereditary, and thereby ruin the reputation of the horse. For these reasons, veterinarians should have decided opinions in reference to the most common defects and work uniformly as much as possible, in passing judgment on horses for breeding or show purposes.

In order to collect evidence on this subject, a circular letter was sent to about sixty well known breeders and the same number of veterinarians who have had experience in breeding. Their opinion was asked in reference to the following defects which are commonly believed to be hereditary: Vicious habits, blindness, roaring, emphysema, spavin, curb, ringbone, sidebone, navicular disease, osteoporosis, deafness, stenosis, light bone, contracted feet, faulty attitude of limbs, low back, weak coupling, cryptorchidism, stringhalt, shivers, and crampiness.

In looking over this list many defects will be seen that may be produced by accident. While it is not difficult for a person of experience to recognize some of them, it is sometimes impossible to discover the true cause.

The subject of heredity is very complicated and it is not to be expected that the present generation will be able to solve all its mysteries. Many horses are sound from a breeding point of view that are not even serviceably sound for saddle or harness purpose. Conditions that are caused by accidents, over-work, bad care, and some acute diseases, should not ordinarily condemn for breeding purposes, yet they may render them practically worthless for work.

Let us review the etiology of the listed abnormal conditions, and see what part heredity plays in producing them.

Vicious habits cover such defects as kicking, biting, running away, cribbing, weaving, balking, etc. Most authorities agree that traits of character are transmitted, yet it is known that in a large majority of cases such defects are due to bad handling, and with proper treatment many horses with decidedly vicious habits will become the most amiable. Nature has apparently done her part well, yet man's ignorance has made it appear a failure.

Several breeders, as well as veterinarians, have seen cases where such habits were transmitted and consequently believe that they should receive serious consideration from a breeder's point of view. Dr. John V. Newton cites the case of "Marcus Claudius," a draft stallion that he owned. This horse had a mean disposition, and fifty per cent of his get were affected in the same way.

From the evidence collected it would appear that horses vicious by nature should be excluded.

In reference to blindness, two forms are questionable, viz.: periodic ophthalmia and cataract. These diseases are much more prevalent in some sections of the country than in others. A few breeders, as well as a number of the leading veterinarians, expressed positive opinions in reference to their being hereditary. In the Report of the Veterinary Examination of Stallions by the Department of Agriculture in Australia, cataract is listed as an hereditary unsoundness. In the human family, cataract of childhood is looked upon as congenital, while cataracts that develop after maturity are not so considered.

Periodic ophthalmia is not seen in the human family and yet it is practically the only recognized cause for cataract in horses. In the great majority of cases periodic ophthalmia develops only after maturity. Congenital cataract has been known in foals.

Some of our text books and many of the most thorough investigators consider ophthalmia as infectious, and cite a number of interesting cases as proof. It would appear that there is more reason at present for excluding sires or dams afflicted with this disease on account of its infectious nature than from an hereditary point of view.

Roaring and broken wind are listed as hereditary by English and Australian authorities. None of the correspondents reported a case where the trouble was believed to have been transmitted. Dr. George White, of Nashville, Tenn., reports one sire and twenty-five dams that he has known to be roarers, but mentions none of their get that were affected with bad wind, yet he believes the disease to be transmissible under some conditions.

"Prince Charley" was condemned for the stud in England, but was purchased and brought to Kentucky by Mr. Daniel A. Swigert. He sired two crops of colts but none of them had bad wind, so far as is known. Among his get can be mentioned the well known "Salvator." Some of his get have also made good sires and transmitted his good qualities, but no roarers.

"Ormonde" is another example of a horse rejected by England for roaring. None of his get, in either the Argentine or this country, have been reported as affected in the wind and a number of them are well known.

Roaring is found in all breeds and all families of horses. Many of the best draft stallions have been condemned on account of roaring. Some have developed this condition after being imported at great expense and were rejected from the stud for this reason. It is well known that the disease often follows influenza, strangles, pneumonia, etc., and it also develops from unknown and mysterious causes.

Experience would indicate that horses should not be excluded from breeding on account of roaring alone, in the absence of a history of roaring among the immediate ancestors, especially if the conformation of the neck and throat is good, though extreme caution should be exercised in the use of stallions so affected. There is no clear recorded evidence for rejecting breeding animals afflicted with heaves or emphysema.

Spavin was described by the oldest writers on the subject of veterinary medicine and the subject has received almost constant attention for hundreds of years. Many causes and theories have been advanced. They have been classified in various ways by different authors according to supposed causes and the pathological changes observed. At the present time a spavin is considered a chronic inflammation of the hock joint. Moller justly says that it is a collective, clinical term covering a number of extremely diversified anatomical changes in the hock. We recognize bog and bone spavins. Bog spavins are soft, painless enlargements seen on the inner, outer, and anterior faces of the hock. They are the result of an excessive distension of the capsule of the hock joint with synovia. The contents of the enlargement may be forced from one point to another by pressure. The condition is sometimes called thoroughpin. It seldom causes lameness except when in the period of formation or after hard work in cases of excessive distension. It may be seen in young as well as in old horses.

Bone spavin usually appears as a hard bony enlargement on the internal face of the hock. It may show on the posterior face where a curb develops. There may be heat, tenderness and lameness, or the enlargement may be seen with none of the other symptoms present. In some of the most obstinate forms of spavin, there may be intense lameness and no apparent enlargement. It may be observed in horses with hocks of excellent, apparent or superficial, conformation. For this reason spavin is often difficult to diagnose.

Bad conformation is one of the most common predisposing causes of spavin and such conformation is unquestionably hereditary. The conformation in which spavins are most often found, is the narrow hock; too much cut out under the hock, sickle hocks, too wide conformation, and in which the horse stands too far back with the hind feet.

Defective hocks should be considered among the worst faults in a horse. Weak hocks, curbs, and spavins have often been observed in whole families. For these reasons the hock should receive the most careful consideration in an examination of horses for any purpose. Sires or dams with weak hocks, especially so if they show curbs or spavins, and families in which this fault exists, should be rigidly excluded from the breeding ranks.

In those cases in which curbs or spavins develop at an early age, before the horse is put to hard work, breeding should not be permitted. Yet it does not seem just to establish a law that would exclude from breeding all horses that have spavins or curbs. When such unsoundnesses are developed after maturity, and especially if it can be shown that the conditions are due to injury or excessive strain and that the animals are from good families, are of the proper type, and have good conformation, they should not be condemned.

Of 813 stallions examined by the Australian commission, 17 were rejected for bone spavin, 5 for bog spavin, and 11 for curbs. In the number examined, 358 were draft horses, and 270 light driving horses. Of the draft horses, 3 were rejected for bone spavin, one for bog spavin, and none for curbs. Of the driving horses, 13 were rejected for bone spavin, 4 for bog spavin and 6 for curbs. It does not state whether any consideration was given to conformation or age. It is presumed that they were rejected for these faults regardless of cause.

When considering the subject of ringbones, many reasons will be observed why horses afflicted with them should not be condemned indiscriminately. Ringbones may be caused by faulty shoeing, strains, or traumatisms, and, if so, the horse having them should not be excluded, especially where the animal has good conformation and other desirable qualities.

Ringbones, as spavins, are looked upon as serious defects, and, like them, may be due to a faulty conformation, and in this case the horse should be condemned. Long, thin pasterns, or very short, stiff, upright pasterns and the base wide, base narrow, toe wide, and toe narrow conformations are defects that predispose to ringbone, and conformation of this type is pretty sure to be transmitted. Horses with such faults should be excluded whether ringbones are present or not. Horses that have developed ringbones before maturity or before hard work has been done should also be rejected.

Of the stallions examined for a license in Australia, 8 of 358 draft horses and 3 of 270 light driving horses were condemned for this reason.

Sidebones are conditions in which the lateral cartilages of the foot become ossified either partially or completely. Heavy, coarse bred horses are especially predisposed to develop them. They are seldom seen on the hind feet. The left front foot is more often affected than the right and the inside cartilage less often than the outside one.

Lungwitz, who examined 1,251 horses, found 144 of them affected with sidebones as follows:

Of 98 Belgian Cart Horses, 68 had sidebones.

Of 120 Danish Carriage Horses, 25 had sidebones.

Of 388 Heavy Riding Horses, 36 had sidebones.

Of 132 Other Heavy Riding Horses, none had sidebones.

Of 133 Light Riding Horses, 8 had sidebones.

Of 140 Riding Horses of all sizes, 3 had sidebones.

Of 200 Military Horses, 1 had sidebones.

Of 40 Officers Horses, 3 had sidebones.

Of 1,251 Horses, 144 had sidebones.

Of 813 stallions examined by the Australian commission, 80 were rejected on account of sidebones as follows:

| | | |
|---|---|---|
| 358 | Draft Horses........ | 77 had sidebones |
| 270 | Light Horses........ | 3 had sidebones |
| 185 | Ponies ................ | 0 had sidebones |
| 813 | | 80 |

In answers to my circular letter, two correspondents would, and eight would not, reject horses afflicted with sidebones. The Australian commission has observed the transmission of sidebones from sire to sons and from son to grand-sons. In one case they examined twelve stallions from one sire and eleven of them were condemned for this defect. One of the best arguments in favor of the transmission of sidebones is the fact that in some whole families of heavy draft horses none are found.

When Veterinary Inspection was adopted by the Royal Shire Horse Society it was found that 33 per cent of the show horses had sidebones. They were found more common in the coarse Shire type than in the cleaner-boned Clydesdale.

There seems to be the greatest diversity of opinion among veterinarians in reference to sidebones. Some, among them Dr. George H. Barns, look upon them as very trivial defects and from observations made for many years on draft horses, especially, believes that a horse is but very slightly more liable to go lame with sidebones than without them. While according to others, a horse is liable to work sound on city pavements with ringbone as with sidebone.

Moller recognizes three principal causes. The first is a congenital predisposition in heavy, coarse-bred horses; the second is excessive concussion produced by work or hard roads; the third is due to shoeing with calks, by which the frog is prevented from taking any bearing on the ground and the lateral cartilages are subjected to a continuous, downward strain.

Horses with sidebones cannot be passed as sound for hard work on the city pavements. They are not infrequently seen on green draft horses, fresh from the country. While we must admit that many horses with sidebones are serviceably sound, yet a large percentage of them will go lame as a direct result of this defect or from secondary diseases of the hoof coming therefrom. It would appear that we are justified in condemning stallions for breeding purposes when sidebones develop before they have been shod or have done any heavy work on hard roads.

Very few of my correspondents expressed positive opinions in reference to the transmissibility of navicular disease. Dr. Edgar Powel mentions a mare that he owned and used for breeding purposes that he believed to have had this disease for twelve years. The diagnosis was not confirmed by post-mortem examination. She was bred to a Thoroughbred stallion once and four times to a Hackney. Most of the colts were unusually good. Two, at least, were show horses. All of them developed into sound saddle and harness horses. worked hard and none of them ever showed a symptom of navicular disease. On the other hand, equally convincing cases that showed a hereditary tendency were cited by other veterinarians. It may require months to make a positive diagnosis of navicular disease and it is then best completed by an autopsy. The condition is practically incurable, and in advanced cases neurotomy is the only means by which the animal's usefulness may be prolonged.

Cadiot reports that out of 403 horses brought to the Alfort clinic from 1896 to 1897, 108 were suffering with different affections of the feet and navicular disease was diagnosed in six. Probably about one per cent of a veterinarian's practice will be navicular disease. Contracted sole may show practically the same symptoms and is often associated with it. Contracted sole is curable in uncomplicated cases and the animal can be restored to soundness. The Australian law does not list navicular disease as transmissible.

It is most often seen in well-bred horses; in draft horses, seldom, and it appears usually in the front feet. and most often in horses with deep, steep contracted heels. yet it is often seen in feet of the best conformation and has been found in the hind feet.

The causes mentioned by Moller are heredity, traumatisms and metastases. As matastatic causes, diarrhoea, various general infections as strangles have been suspected. Direct violent traumatisms may play a small part in the production of the disease but the usual cause is the traumatism of wear; the pounding and strain of hard work.

The pathology of the disease is fairly well understood, but as to cause, prevention and treatment, there is still much to be learned.

It would appear just to condemn, for breeding purposes, horses afflicted with this disease where it has developed from small cause, where it is of long standing and both feet are affected.

Osteoporosis is one of the listed hereditary unsoundnesses in the Australian law. From observations made in this country, it could not be so considered. Many cases sent to the country recover, and so far as could be learned, no outbreaks have occurred in sections to which such cases have been sent.

Several bad cases of big head in fillies were sent to Mr. Henry Fairfax, in Virginia, from near Philadelphia. All made a complete recovery by the time they were five years old. They were regularly bred, and the disease never appeared in their colts on the farm.

If Osteoporosis is due to infection or malnutrition, as many investigators believe at present, there is no reason for considering it hereditary. The evidence is, however, strong in favor of the theory of infection, and warrants breeders in isolating or destroying well marked cases.

The following quotation from an article written by M. J. Basset, of the Alfort School, and printed last year in the Recueil de Medecine Veterinaire, on the subject of "Osteomalacia," will show the opinions held in reference to big-head in Europe. It is as follows: Osteomalacia is common in man, horse, ox, goat, sheep, swine, dog, rabbit and rat.

The disease is known by various names which change with investigators according to the way that the symptoms and alterations strike their fancy. The term "Osteoporosis" implies that after macerating and drying the bone is porous and light. "Osteomalacia" implies fragility of the bones or that they break easily. "Osseus cachexia" is a state of profound misery in which the patient is not able to take the necessary amount of nourishment. In swine, it is known as gout or foot disease. "Sniffles" is a term often applied to it in swine when the nasal cavities are restricted by the increased thickness of the vomer and the other bones of the head which restrict the air passages and cause loud breathing.

In horses it is sometimes called "Bran Disease," because it develops often in Switzerland and Germany in millers' horses, which are fed freely on bran.

We prefer the term "Osteomalacia" because the partial or total softening of all the bones of the body described by the first observer, is always present. We believe that it is logical to reserve this ancient designation until the true cause of the disease is discovered and it can be given a more precise and suitable name.

The list of predisposing causes is rather long. One finds, as in all infectious diseases, circumstances for diminishing the resistance of the organism. The determinate cause of osteomalacia is still unknown. The solution of the problem should appear soon for the reason that Mousau has reproduced the disease experimentally in swine and goats. Mousau and Charrin have reproduced it in a rabbit. This was done, says Mousau, either by co-habitation with an affected animal or by the subcutaneous inoculation of the bone marrow during the beginning or the active period of the disease.

In a preliminary communication to the Academy of Medicine of Turin February second, 1906, Morpugo gave the results of numerous experiments on young and adult white rats. In these experiments which were begun in 1898 and partially reported in diverse publications, the author produced the disease at will, either by co-habitation or by inoculation of germs supposed to be diplococci isolated from subjects that were affected with the disease. Observations are numerous, which indicate clearly the infectious nature of osteomalacia.

In 1874, Paul Bouley summed up the many observations on the subject of osteomalacia in man and domestic animals. He wrote, at that time, that the only therapeutic proceeding that had rendered service was emigration from the place where the disease developed or removing the animal to a richer locality. It is now known that the richness of the soil has nothing to do with curing the disease. Captain Robertson, in an article on "Osteoporosis," in the Veterinary Record. says in reference to affected horses, that they recover by simply removing them from the infected district without even changing the food. No treatment is effectual except a complete change of location. He cites a village where it was proven that the disease was imported by a race horse. Pecaud cites a similar case. At one time the disease was recognized only in the State of Dape Cau, Indo-China. The afflicted animals were sent to Sontay where they improved or recovered. For the past three years Sontay has been badly afflicted with the disease.

In the regions where the disease is epidemic it has been attributed to the soil, climate, etc. At times droughts or too much humidity may play a part, yet the disease is not found alone under these conditions.

No information was received on the subject of deafness.

The following is an interesting instance of inherited unsoundness: The black mare "Ebony Bell" made a few sensational appearances in the show ring. She developed suddenly a severe lameness in the near hind leg, at the Philadelphia Show. The condition was considered as a light attack of azoturia. She recovered fully in a few minutes, but developed the same condition in her next show appearance, which was at the Garden, the following fall. Again the veterinarians diagnosed azoturia, and horsemen called it "kidney shot." She was retired from the show ring, but would develop the same peculiar lameness whenever she was exercised. She was bred two years, and not driven or ridden during the time. She had two foals which developed the same character of lameness soon after being broken. The writer suspected stenosis of the external iliac artery in the dam, and by a rectal examination verified the diagnosis. She was then destroyed. The diagnosis of stenosis in the case of the foals was made by the history alone. It would appear that the trouble in them was plainly due to hereditary causes.

Light bone, faulty attitude of the limbs, low back and weak coupling, are faults of conformation. There can be no question but that defects of this character can be transmitted. Breeders should not use such animals. Stallions with these defects should be classed as nondescript specimens, and those that do not possess true race characteristics, are off type, etc., should be prevented by law from service in the stud.

Contracted feet may be the result of bad care or improper shoeing, and, if so, would not be transmissible. Where it is known to be a family characteristic or a congenital defect, it is looked upon as transmissible.

Cryptorchids and monerchids are usually spoken of as ridgelings. There is difference of opinion among breeders in reference to this condition being transmitted. The operation of gelding them is not well understood by the average castrator and fatalities are more common than in the normal operation. For this reason breeders should consider the advisability of using ridgelings.

The true cause and pathology of stringhalt, shivers and crampiness are not known. Stringhalt is sometimes seen with spavin or a defective hock, and if so, should be rejected. No cases were reported where sires or dams with these defects were bred and no opinions were given in reference to their transmissibility.

It is hoped that the study of hereditary diseases will receive more united study in the future. This question should interest breeders and veterinarians. Our profession will be called upon in the future, more than in the past, to give opinions in reference to it.

Stallion laws are beginning to be recognized as necessary and wherever they have been intelligently enforced there is a marked improvement in the type and character of horses.

A nondescript brood mare can do but little damage compared to the harm that such a stallion may cause in a breeding district. The ideal horse should be free from defects of all kinds, but great injury or injustice would result to the breeding industry if only such perfect animals were allowed to breed for the reason that there are so few perfect animals. To know how far one can safely go in overlooking defects is a difficult question. If we had true statistics on all that might be known in reference to the subject we would be better prepared to make laws and regulations for the future. We would attempt in all possible ways to collect true facts on this important subject.

In the meantime, laws disqualifying horses from breeding on account of unsoundness should be conservatively drawn. The following is the Pennsylvania statute of 1907 on this subject:

"Stallions afflicted with hereditary, contagious, or transmissible unsoundness, or disease, may be refused license by the State Live Stock Sanitary Board; and when license is so refused, the said stallion shall not be used for public service or profit or gain in this State. Provided, however, that a license may be refused under this section, only when it is certified to the Board by the State Veterinarian that the stallion in question is afflicted with an hereditary, contagious, or transmissible unsoundness or disease of such a nature, or that the abnormal condition is accompanied by such a defect of conformation as to render it probable that the progeny of the said stallion will be specially liable to said unsoundness or disease. Blemishes and deformities due to accidents shall not be regarded as unsoundness, within the meaning of this Act."

After the reading of this paper, Mr. Powell again took up his report as follows:

You will notice that we have recommended nothing, so far. After giving full consideration to the matter, and also consulting with a good many others, we have come to the conclusion that the law be so amended that the defects be covered in the certificate. At the present time there are men in every county who, under cover of the State license, are doing much to continue hereditary unsoundness in horses. Any one who has given any observation to the matter, knows that this is so. In our conservative report, we would simply recommend that the certificate set forth what these unsoundnesses are, and then let the breeder draw his own conclusions as to whether he wants to breed to these defects, or not.

Now, there are defects that are the result of accident, but are of very little account, and there are others that are of very great account. Just a little instance from my own experience: We had a horse, a very valuable one, with as good eyes as I have ever seen. By accident, one of the boys struck him in the eye with a whip. We paid very little attention to it, but to our great surprise, the colts born during that period all had defective eyes. We have investigated back for several generations, but can not find that any of his ancestors had ever shown this defect. This is one of the things that we must take into consideration, and must educate the people up to.

There is one thing that you will notice in the report there; the Doctor spoke of what kind of hocks are likely to produce spavin, and so on. How are you to guard against them? It becomes a matter of judgment; it cannot well be described. Horses have the same individuality as man, and every man has his own individuality. When I meet our President, I know him. Can I tell you how I know him? You know him when you see him, but can you tell me how I will know him when I meet him? What we will say is that he is a good-looking man, about such an age and size, very agreeable to speak to; but it does not cover the individuality; we must learn that by practice. So it is with horses. We must learn to judge them by practice.

We have given this matter no little consideration, and you have our report, most respectfully submitted.

President Norton—Gentlemen, you have heard that report. Won't some one move that it will be adopted?

Dr. Gay—Before the report of the committee is adopted, I would like to ask Mr. Powell a question. Do I understand that you would cover every case of unsoundness by simply publishing on the certificate what it is?

Mr. Powell—In every case, absolutely.

Dr. Gay—And not disqualify that horse?

Mr. Powell—If the horse is so faulty as to be disqualified, a commission should be appointed to investigate that matter. The Veterinary Department should authorize a committee to report on that point. Then, a man whose horse has been reported unsound by a local veterinarian has the same right to appeal to the commission.

Does that cover your question?

Dr. Gay—Yes.

President Norton—Will some one make a motion that the report be adopted?

Mr. Cowan—I move that this report be adopted.

Mr. Palmer—I second that motion.

The vote was carried in the regular way, and the report of the committee on Hereditary Unsoundness adopted.

President Norton—Now, I think this report should be discussed, but I believe it will be well to wait until we have heard Dr. Gay. Dr. Gay will now talk to us on "The Pennsylvania Stallion Law."

Mr. Bayard—Before Dr. Gay begins his speech, I want to announce that the corn will be sold immediately at the close of this session. We want you all to stay; you can't afford to miss it; you will all have a chance to bid on it, and secure some of the prize ears.

Dr. Gay then spoke as follows:

# THE PENNSYLVANIA STALLION LAW

## By Dr. Carl W. Gay

Gentlemen—I have advertised the Pennsylvania Stallion Law up one side and down the other, until it seems like an old story, and I hesitate to say any more about it, but for that very reason it does seem desirable to say something about it after a year of operation, and at the request of Mr. Norton and Mr. Bayard, we will take it up for your discussion.

Stallion laws have been passed in this country by Wisconsin, Minnesota, Utah, Iowa and New Jersey, and now Ohio and Kansas are adopting the same thing, and I happen to know that Indiana will not be long in falling into line.

So far as the operation of the law has been concerned in this state, perhaps you have heard criticism after criticism made, and there are some things in the law that require amendment, and they will be amended by the people of Pennsylvania.

Now, I have had the opportunity this past year of getting at this law from various view-points—from the point of view of the men who were responsible for its enactment—from the point of view of the men who were responsible for its enforcement, and, lastly, and most important, from the mare owner's point of view. In these views I find certain criticisms that I have already referred to, and I think they come from two sources.

There are two classes of stallion owners; the first are the men who own good horses. They commend the idea of the law, but they claim it does not give them the protection they should have, and with that criticism I sympathize. The other class I cannot sympathize with; they are the men who are pinched by the law. They are men to whom the law has permitted the opportunity of standing their horses for public service, and they have no just cause for complaint.

Now, in regard to this report of the committee, I would say that it meets with the entire approval of the Department. The report was referred to the Veterinarian before being presented, and has the entire approval of that Department. I know something of this committee and their work. Some of you may be surprised that they do not specify unsoundness, but there is so much latitude in that, so much difference in opinion as to what really constitutes unsoundness, that I think they have very wisely recommended stating in the certificate what particular form of unsoundness the horse is suffering from, and then leaving it to the breeder's option whether to breed to him or not. Nearly all the States agree as to what really constitutes unsoundness, they all have practically the same list. Iowa is unique in that it does not refer at all to unsoundness.

My observations have led me to believe that we are not justified in raising a certain list of diseases as disqualifying a horse absolutely. There may be cases which would come under the list, which would absolutely not affect a horse from a breeding standpoint, and there are other things besides soundness that make a horse good. We should do nothing to discourage horse breeding in this State. In a general way, I should say disqualify every form of unsoundness, but you take all the horses in Pennsylvania, and you will find that very few of them are entirely free from one form or another of unsoundness, and in disqualifying these horses for some form of unsoundness, you are disqualifying some of the best horses in the State. In spite of the fact that they have some form of unsoundness, included in the list named, they are getting a better class of colts than many of the horses that are absolutely sound and pass all the requirements of the law.

The reason I asked Mr. Powell this last question is that I think this a matter for the mare owner. I believe that the mares should have all needed protection, but I still think one of the important things is to discourage breeding, and there is a great deal to do in that line. Nondescript stallions are represented as pure, and unsound ones are represented as sound, and the first thing we have to do is to educate the public up to a knowledge of type and conformation and the importance of pure blood, and to get them away from the old mongrel.

Now, I believe that in order to accomplish something along that line, we have to do more than disqualify the horse for unsoundness. The certificate clearly states that the horse is pure-bred or grade, and if the recommendation of the committee is carried out it will state in what particular form he is unsound, and leave to the option of the mare owner whether to breed to him, or not. But it seems absolutely necessary to disqualify some horses, and for that reason I would not accept the report of the committee as it was first made. It is absolutely necessary to disqualify some horses to overcome the harm they might do. Even then, I believe, it is better to merely state his unsoundness than to disqualify him altogether. It is so hard to decide positively this question of unsoundness in sires, and so long as the least uncertainty exists, I don't believe I would disqualify such a horse altogether. So long as we cannot specify any definite unsoundness, I think you will agree with me that it is not to the best interests of all concerned to absolutely disqualify them, and I think we will find better horses in Pennsylvania ten years hence if we do not disqualify them than if we do. I am not advocating an unsound horse, but I know the class of horses that are being bred in this State, and I think if these horses are passed over into Ohio or Indiana because we disqualify them in Pennsylvania, that Pennsylvania will be the loser.

You have, perhaps, been reading about the Stallion law in New Jersey. Now, I happen to know that the conditions over there are different. In New Jersey they have very little desirable blood. In Pennsylvania we have just as good blood as you will find in any State. I will pick you out two counties in this State, and anybody who knows anything about any county in any State in the Union, will agree with me that they breed just as good coach horses in these counties as they do in any State in the Union, and we have the same class of horses in other breeds throughout the State, and unless the men who breed these horses are protected by law, they are certainly not going to do it. You will find the stallions here to produce good blood, and we have reached the point where it is necessary to educate the mare owners up to a good sire, and then go a little farther and take away from them a certain class of sires that are absolutely detrimental to the horse breeding interests of the State.

Now, I don't care to talk too much about this. I have talked about it and written about it until you must be tired hearing it. Last year the law was pretty much in prospect. Now, we have had it in operation about a year, and have had a chance to see how it works. There are some cases where the law has been violated, and horses were misrepresented. For instance, we have known a certificate to be altered in regard to the age of the horse it described. In another case the little word "not" was taken out —of course by "printer's error!"

Then, there has been another class of men who have been careless in the matter of pedigree registration. They have come along with a "somebody said so," expecting to get a pure-bred certificate, but, on the whole, if you were to ask Knight of the Trotting Association and Glenn of the Percheron Association, you would find that they made a good many more registries this year than last.

Then, there is another thing of note, and that is: the number of horses coming into the State. A new draft horse came into Mercer County this week, I understand, and one came into Chester—Delaware County—an excellent horse; another one into New Castle. Within the last few months a large number of fine horses have come into the State. Now, it seems to me this is a mark of confidence. These men began to think they had some protection, and went out and made these purchases, and I believe that when you take these things into consideration, you must admit that this has been an improvement.

Mr. Hutchison—How do you know that these horses in Delaware and Mercer are good horses until they are tested?

Dr. Gay—I will tell you, Mr. Hutchison; that is a very important point. We have never seen a colt from any of these horses, and we don't know until we try them, but we have every indication that will give us confidence in them as sires, although we don't know anything about a horse until we try him. This Commission Mr. Powell spoke about would constitute a Court of Appeal, and they would be well fitted to take up cases of this kind, and look after such a horse, and see whether he is good.

President Norton—What would you say about the Commission examining all stallions?

Dr. Gay—Every one, or only those that are to be tested?

President Norton—Every one.

Dr. Gay—My idea exactly. We can do it. There is a vast difference between a man's own idea of what constitutes a good horse, and what really does constitute a good horse. I have seen horses all over this State which their owners thought were good, and when my opinion was asked I was ashamed to give it. And yet these horses came within the limits of the State law, and we could not refuse them certificates. It seems to me that the whole matter is a matter of arbitration. Each man may have his own idea, but let the matter be settled by a Commission, and there can be no question. I have known men to testify to one horse as unsound, and then call another horse sound that was a hundred times worse. If you can get one commission to pass on all stallions, it would be along the same line as New Jersey. There they have only twenty-one counties against our sixty-eight, but I think it would be the best thing anyhow; it would finally settle all disputes on the question.

Mr. Van Norman—Can't you offer some inducement for a Voluntary Commission?

Dr. Gay—We have tried in every way to think of a plan to do that that would go through. And then the trouble would be lack of uniformity. This lack of proper classification is one of our greatest drawbacks. For a horse to be in the wrong class is just the same as if he had no breeding whatever.

President Norton—Don't you think it would let down the bar to the grade stallion?

Dr. Gay—Mr. Norton and I understand each other. As I said before, I do not think it advisable to weed out the good grade until you have pure-bred horses up to the standard of the good grade.

Mr. Van Norman—How do you understand it is a bar to grade or pure-bred?

Dr. Gay—I think that is a matter of limitation in the pure-bred as well as in the grade. Secretary Dunlap has one of the best horses in the State, and he was ineligible for pure-bred. I know another one in Crawford, one of the best horses in the State, but, good a horse as he is, I am not in favor of grade breeding. Let us go to breeding good, sound horses, and in time we can eliminate the grade—or he will eliminate himself, as the public becomes educated up to the advantage of good sires.

Mr. Gooderham—I would like to ask the Doctor whether he thinks it would not be possible to have a committee appointed, and have the stallions all meet in one or two places in each county at a particular time and then have the Commission meet the owhers there and save expense?

Dr. Gay—It certainly is entirely feasible, and it has been suggested, but the objection has been raised that some of the stallion owners would have to go twenty miles. Another plan that has been suggested is to have a Fair and have the Commission meet the stallion owners there. Of course, it would be impossible to have a man in each county, but it would be possible to have three men who would go over the State, and I believe that if you would centralize your horses at a given point at a certain time, the State would take care of the Commission.

Mr. Van Norman—They could issue a first grade and a second grade certificate.

Dr. Gay—That is very true; but it would probably be a little hard to distinguish between the two.

Mr. Van Norman—I would have the second grade put in red ink.

Mr. Norton—I want to thank the Committee for the good work they have done, and then, if there is nothing more, we will adjourn to meet at half past nine tomorrow morning. Tonight we will be glad to have you all at the banquet at the Lochiel at nine o'clock.

Prof. Van Norman—We have the proper badges for the banquet, and I have the tickets for those who have the price.

Mr. Bayard—No adjournment until this corn is sold. Stay where you are. Prof. Burkett will act as auctioneer for the prize ear, and you will all have a chance to bid on it.

## ADDRESS OF PROF. BURKETT

Ladies and Gentlemen: I am glad to take part in this great corn improvement in Pennsylvania. I was not born in Pennsylvania, but I was born just a little ways off, in another State. I have had the pleasure and privilege of taking part in a good many corn shows. I used to be out in Kansas. One time there I was introduced as coming from Ohio, and the toast-master, intending to be complimentary, said when I came from Ohio to Kansas it was an improvement and a help to both States.

Now, any one knows that Pennsylvania can grow corn. The speakers this afternoon have been telling us about horses. Now, this Breeders' Association knows the value of good blood horses, and they want to see this good blood in men, and in animals, and in corn. I fear when it comes to farm crops we have not paid very much attention to blood. The price we have paid for corn heretofore shows that. Out in Kansas they sold some prize corn, and they ran it all the way from $300 down to $10. You may say that no ear of corn is worth three hundred dollars, but you think nothing of paying from a thousand to fifteen hundred dollars for a pure-bred animal, and we should get a proportionate price for a pure-bred ear of corn. When it comes to corn, we are like the man who took half interest in a hog for $56—

A Member—"Which half?"

Prof. Burkett—The front half, and that was the smallest part, too. We are apt to buy corn without discrimination. Now, we can work up a pedigree in corn as well as in other things. Now, take this prize ear. It is a beautiful specimen. I have taken part in a good many of the corn shows of the West that we hear so much about, but I have never seen better corn in my life than has been grown right here in Pennsylvania. The Western States have no such yield of corn per acre, as has the great agricultural State of Pennsylvania. We have a higher yield per acre in this State than in many others. What do the reports of the Department of Agriculture say? For the entire State the yield is 38 bushels per acre. Why, Illinois, the great corn State, had an average yield this year of only 31 bushels per acre; and then say there is nothing in corn in Pennsylvania!

I did not come here to talk, however, and I only want to say that we have not placed the proper standard upon wheat and oats and corn, and things of that sort in this State. Look at this prize ear of corn. It has pedigree and blood and breeding. It has been carefully selected for many years, and these features have become uniformly set in it, and it has become the Champion of Pennsylvania. If each grain is taken and grown, this ear is worth at the lowest figure a thousand dollars. I don't expect to get that amount for it, but I do expect to get a good sum for it. Of what variety is it?

Mr. Bayard—Funk's Yellow Leaming.

At this point the bidding began, and the corn was sold to the various bidders, after which the session adjourned until Friday morning.

Friday, January 29th, 1909.
9.30 A. M.

Mr. Norton in the Chair.

Mr. Perham—Mr. Norton will read the report of the Nominating Committee of the Dairy Union. This matter was left in Mr. Norton's hands because it seems that they have nominated practically all the old officers.

Mr. Norton thereupon read the report of the Nominating Committee of the Dairy Union as follows:

For President, W. E. Perham, Niagara, Pa.; Vice President, J. G. Reist, Mt. Joy, Pa.; Secretary, H. E. Van Norman, State College, Pa.; Treasurer, W. D. Marshall, Lyndell, Pa.

Directors—G. M. Carpenter, Wilkes Barre, Pa.; E. E. Jones, Harford, Pa.; H. B. Richards, Easton, Pa.; M. P. Shoemaker, Greensburg, Pa.; D. R. Stevens, Sayre, Pa.; P. P. Gheen, Willow Grove, Pa.

Representative on Executive Committee of Allied Agricultural Organizations —L. B. Henson, Coatesville, Pa.

On motion, properly seconded, and duly carried, the report of the Committee on Nominations was adopted, and the Secretary instructed to cast the ballot for the officers as named.

Prof. Van Norman—As instructed, I cast the ballot for the officers as named by the Committee on Nominations.

President Perham—Is the Committee on Resolutions ready to report?

Prof. Van Norman—I have the report, but the members of the Committee seem to have all succeeded in getting away.

Prof. Van Norman then read the report of the Committee on Resolutions of the Dairy Union, as follows:

## Report of the Committee on Resolutions of the Dairy Union

WHEREAS, with the present funds and means of support, the Dairy Union cannot do its best work,

RESOLVED: That the Secretary of Agriculture, Hon. N. B. Critchfield, be requested to include in his budget an appropriation of $1,000 per year for the next two years, for the work of the Dairy Union.

President Norton—I move that the Resolutions be adopted in sections, as read.

This motion was properly seconded, and carried in the regular way, and a vote having been taken on the Resolution just read, it was adopted.

Prof. Van Norman then read the second Resolution, as follows:

WHEREAS: The Dairy division of the United States Department of Agriculture has done so much to make our meeting a success by the addresses given by Acting Chief Lane, and the scoring of the butter by C. W. Fryhoffer, of the Department, be it

RESOLVED: That we hereby tender our thanks to the Secretary of Agriculture for the efficient aid rendered by these men.

This Resolution was adopted in the regular way, after which Prof. Van Norman read the next Resolution, as follows:

WHEREAS: Secretary Critchfield of our State Department has co-operated with our Dairy Union, and assisted materially in making our meeting successful,

RESOLVED: That our thanks are hereby tendered to him for this assistance.

This Resolution was also adopted in the regular way, after which Prof. Van Norman read the next one:

WHEREAS: Dr. Leonard Pearson, State Veterinarian of Pennsylvania, together with the officers of the Federal Government, has done effective and heroic work in stamping out and preventing the urther spread of the Foot-and-Mouth Disease in our State.

RESOLVED: That the members of the Dairy Union hereby tender their thanks to Dr. Pearson and all who aided him in this work for the efficient work they have done, and the effective way in which the whole matter was handled.

This Resolution was unanimously adopted, after which Prof. Van Norman read the next Resolution, as follows:

WHEREAS, the meetings which have been held in conjunction with other livestock and agricultural organizations have been more successful than when held alone, and insure a larger attendance,

RESOLVED: That we recommend the holding of joint meetings whenever it is possible to do so.

(Signed) T. D. HARMAN,
W. D. MARSHALL,
O. D. MOTT,
C. W. LARSON,
Committee on Resolutions of Dairy Union.

President Norton—I was asked to request you people to bring up a Resolution requesting the National Dairy Show to meet in New York at its next session. This Resolution is as follows:

WHEREAS, The Dairy interests of the Eastern States are a leading feature in our Guild, and an immense number of people cannot go to Chicago, therefore be it

RESOLVED: That this Association urges the National Dairy Association to hold its next annual show in New York City.

A copy of this Resolution to be presented to the National Dairy Association at their annual meeting in March.

This Resolution was also adopted in the regular way.

President Perham—Any other matters to come before the Dairy Union this morning? Is the Committee on banquet ready to report?

President Norton—We have not settled the bill at the hotel yet, but I think we will come out just about even. We were afraid yesterday that we would have to reach down into our pockets, but we will not have to do that, although there won't be enough left to get a drink on.

President Perham—Before the Dairy Union is through, is the Auditing Committee ready to report?

The report of the Auditing Committee is as follows:

"We have gone over the accounts, and found them correct, as reported."

(Signed) E. B. NOLL,
H. J. HARRINGTON.

President Norton—Is the Auditing Committee of the Breeders' Association ready to report? If not, we will receive the report of the Committee on Resolutions in the meantime.

By request, Prof. Van Norman read the report of the Committee on Resolutions of the Breeders' Association, which is as follows:

## Report of the Committee on Resolutions of the Live Stock Breeders' Association

On motion, duly seconded and carried, these Resolutions were adopted section by section, as read.

RESOLVED, That the sale and use of tuberculin should be regulated by law, in such a way that fraud from the improper employment of this valuable diagnostic agent will, so far as possible, be prevented.

RESOLVED: That the work of the State in relation to cattle and dairy inspection should be conducted only by trained men, who are chosen with reference to their knowledge of these subjects.

RESOLVED: That we commend the work of the Veterinary Department of the University of Pennsylvania, and we recommend that a sufficient appropriation be made by the Legislature to this Institution, so that it may more adequately meet the needs of the State in the fields of Veterinary research and education.

RESOLVED: That we recommend the immediate passage of the bill to appropriate $90,000 to the State Live Stock Sanitary Board for the payment of necessary expenses in the eradication of foot-and-mouth disease, and for the control of dangerous, contagious and infectious diseases of animals.

WHEREAS: There is annoying lack of uniformity in the manner of reckoning ages of animals for exhibit at our State and National Fairs, therefore be it

RESOLVED: That this Association, through its Secretary, request the National Association of State Fair Secretaries to adopt uniform rules of computing age of cattle; and, further, that we recommend August 1st as the test date.

WHEREAS: The work of the Pennsylvania Live Stock Breeders' Association is a legitimate part of the efforts to advance the agricultural interest of the State, therefore be it

RESOLVED: That the Pennsylvania Live Stock Breders' Association do ask the Secretary of Agriculture, Hon. N. B. Critchfield, to include in the budget of his Department an item of $2,000 for the legitimate work of this Association during the next two fiscal years.

WHEREAS: The State of Pennsylvania should have a great State Fair, such as is held in other states of equal agricultural importance, with the object of bringing together everything of intrinsic value agriculturally, therefore be it

RESOLVED: That each and every member of this Association use his efforts and influence to secure the passage of a bill, at this session of the Legislature, which will make possible a State Fair commensurate with the Live Stock and Agricultural interests of Pennsylvania.

WHEREAS: In the opinion of this Association, the educational value of exhibits of improved live stock justifies every reasonable concession to the exhibitor; therefore be it

RESOLVED: That this Association request the Pennsylvania Railroad and other railroads to make such changes in their rules as to "Exhibits" as to make the rate of freight one-half the regular rate from the point of origin to first point of exhibit, and thence to each subsequent point of exhibit, until the final one shall be reached, and thence direct home from the final point of exhibit, to the point of origin. This is to apply only on registered horses (other than race horses), cattle, sheep, goats and swine, moving for exhibition purposes, and upon presentation of the usual certificate of registry, to the carrier's representative at each point of shipment. One attendant to accompany each less than carload, and two attendants to accompany each carload free, for the purpose of feeding, watering and caring for such shipments while en route between the points specified.

WHEREAS, The State Live Stock Sanitary Board has done most efficient work, especially in the prompt handling of the Foot-and-Mouth Disease outbreak; therefore be it

RESOLVED: That this Association transmit to its Secretary, Dr. Leonard Pearson, this expression of our appreciation of the work of himself and his colleagues.

WHEREAS, The Dairy industry is the leading one in most of the Eastern States, including Pennsylvania; therefore be it

RESOLVED: That this Association urge the National Dairy Show Association to hold its next show in the East, and further, that our members make known to the Show Association their wishes to cooperate to this end.

WHEREAS, The Secretary of Agriculture of Pennsylvania, Hon. N. B. Critchfield, has done much to make possible the success of these joint meetings; therefore be it

RESOLVED: That we, the Pennsylvania Live Stock Breeders' Association, extend to him our hearty appreciation of his efforts.

(Signed) H. E. VAN NORMAN,
CARL W. GAY,
J. E. DODGE,
Committee.

President Norton—Next in order is the report of the Nominating Committee of the Breeders' Association.

Mr. Powell—The Nominating Committee beg to offer the following as their report:

For President, Hon. W. C. Norton, Waymart; Vice-President, Dr. Leonard Pearson, Philadelphia; Second Vice-President, M. P. Shoemaker, Greensburg; Secretary, E. S. Bayard, Pittsburg; Treasurer, J. F. Lantz, Wyebrooke.

Executive Committee—W. G. Powell, Shadeland; M. N. Clark, Claridge; D. Norman App, Selinsgrove; Lee R. Scott, Burgettstown; Henry Fielden, Devon; James Blair, Hartstown.

Legislative Committee—Hon. W. C. Norton, Waymart; E. S. Bayard, Pittsburg; Dr. Leonard Pearson, Philadelphia; Dr. Thomas Turnbull, Allegheny; H. W. Comfort, Fallsington; R. L. Munce, Canonsburg; J. H. Reichert, Scranton; S. E. Nivin, Landenberg; Henry Palmer, Avondale.

Transportation—T. D. Harman, Pittsburg; Dr. J. Cheston Morris, Philadelphia; W. F. Shrum, Adansburg; James T. Fleming, Belleville; F. W. Levis, Chadd's Ford; W. W. Blake Arkcoll, Henry Fielden, M. E. Kerber.

Committee on State Fair and Fairs—Dr. Pearson, E. S. Bayard, J. E. Dodge, F. W. McCoy, W. C. Black, James Blair, J. L. Henderson.

Submitted by the Committee,
W. T. POWELL,
M. N. CLARK,
R. L. MUNCE.

On motion, properly seconded, and duly carried, the report of the Committee was unanimously adopted, and the Secretary instructed to cast the vote.

In the absence of the Secretary, Prof. Van Norman was instructed to cast the vote, which he did, electing the officers named by the Committee on Nominations.

President Norton—I appreciate the honor, and will try to do my duty the best I know how, but I want the help of every man in the State. I want every man to go into his own district, and work, and I believe we can get a State Fair; but we need the help of every county in the State.

Mr. Powell—I would say that we looked the whole thing over, and decided that it was better to let well enough alone. We find that we are quite content with the officers who have done so much for us.

President Norton—The next, I believe, is the report of the Auditing Committee.

Mr. Lantz—I would just say that the books were gone over last night, and Mr. Blair has taken a copy of the report. I expected that the Committee would be on hand to report this morning. I don't know who has the report.

President Norton—Mr. Blair has gone down to the Freight Agent of the Pennsylvania Railroad, with the Railroad Committee, and I don't know when he will be back. Suppose you give us an idea how the books stand.

Mr. Lantz—At the last audit, January 28th, 1908, there was a cash balance on

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| hand of | $346 65 |
| Receipts during the past year | 336 10 |
| Total | $682 75 |
| Expenditures during last year, which included printing, corn prizes, etc | 631 18 |
| Leaving a balance in the treasury of | $ 51 57 |

President Norton—I have no doubt that Mr. Blair is satisfied, but he is not in the room. What shall be done?

Mr. Palmer—I move the report of the Treasurer be approved.

This motion was properly seconded, and duly carried in the regular way.

President Norton—Any further business? If not, a motion to adjourn is in order.

Mr. Palmer—I move we adjourn.

This motion was properly seconded, and duly carried in the regular way, and the Convention adjourned.

## THE WORK OF THE INSTITUTE OF ANIMAL NUTRITION OF THE PENNSYLVANIA STATE COLLEGE.

It is a fundamental principle of democratic government that the people, who pay the taxes, must ultimately pass judgment upon the use made of their money by those to whom they entrust its expenditure.

During the past ten years a considerable amount of the people's money, drawn chiefly from the national treasury but in part also from that of the Commonwealth, has been expended at The Pennsylvania State College in making rather abstract investigations in animal nutrition. The undertaking is a unique one in this country both in organization and as regards experimental methods and equipment. Beginning in 1898 with a proposal from the United States Department of Agriculture for co-operative investigation and the construction of special apparatus, the work has grown until at the present time it requires a staff of nine persons and utilizes a plant costing about $20,000, including the respiration calorimeter which as yet is the only successful apparatus of the kind for experiments on domestic animals. Originally a department of the Experiment Station, the Trustees in 1907 recognized the importance of the work by constituting it a separate department of the College under the name of The Institute of Animal Nutrition.

It is altogether proper, then, that the people should ask what returns they are getting, or are likely to get from their money thus expended. Moreover, while this work, supported by public funds, belongs to all the people and is paid for by all the people, nevertheless, since it is undertaken for the promotion of agriculture, it is practically the farmers who must pass upon its value. I welcome, then, the opportunity to make to this representative gathering of Pennsylvania farmers and stockmen some plain statements regarding the work of the Institute of Animal Nutrition. In doing so, you will not expect me to go into the details of scientific methods or results. The farmer is not and does not pretend to be a scientist. The scientific man who is seeking to serve the farmer is obliged by the nature of the case to demand of the latter a certain measure of faith. He is compelled to ask the farmer to take his scientific abilities largely on trust, and on the basis of that trust to give him, sometimes in large measure, time and money to work out his results, believing that a scientific principle once established is, as all experience shows, sure to work out into beneficent results in practice and in the long run to far exceed in value those more obvious results, like an improved variety, a cheaper scheme of fertilization, or a new remedy for a destructive insect, whose immediate utility is more apparent.

That the farmers are willing thus to trust the scientific man is clearly evident from the rapidity with which appropriations for scientific research in the interest of agriculture have grown of late years. It is all the more obligatory on the scientific investigator in agriculture, therefore, in view of this confidence, and since his ends are sometimes remote and his processes mysterious, to make it clear to the people, whose money he is spending, what the problems are which he is trying to solve and how this solution is likely to benefit the public. As I see it, he should be able to show three things:—first, that the problems relate to agriculture and are of some real importance; second, in a general way how he is trying to solve the problems; and third, that the solution of the problems is likely to be of practical advantage.

I hope to be able to show these three things with regard to the work of the Institute of Animal Nutrition.

Every farmer who feeds live stock of any kind is engaged in converting vegetable materials into animal products. As a good business man, then, he wishes to know how much product he may expect to obtain from a given amount of raw material. In other words, he desires information as to the relative value of different feeding stuffs for making beef, pork, mutton, wool, silk, etc. Moreover, he wishes to know how the economy of the process is affected by the kind of machines (animals) he uses and the conditions under which he runs them. The work of the Institute of Animal Nutrition is an attempt to aid in answering some of these questions. Its problems, therefore, are of a practical nature and of great importance, not only agriculturally but also in relation to the economy of production of human food.

The methods which the Institute of Animal Nutrition is using in the study of these problems are not fundamentally different from those which would be used by the practical farmer. If we want to know how much beef can be produced from a bushel of corn there is only one way to find it out—to try it. The difference between the farmer and the scientific investigator lies simply in the way in which they try it.

At first thought the solution of such a question would seem to be a very easy matter; one within the reach of any intelligent feeder and calling for no elaborate appliances. As a matter of fact, the experience of the last seventy-five years has shown that it is by no means as easy as it appears. The apparently simple method of feeding the substance in question and observing the results on the animals by means of the scales, while it has demonstrated many interesting and important facts, has not led to the establishment of general principles nor aided greatly in building up the science of feeding. Why this is so, it is not necessary to discuss here in detail, but in general it may be said that the principal difficulty is in determining accurately and in detail the real nutritive effect. The Institute of Animal Nutrition is simply trying to determine more exactly than is possible in the practical experiment just what the animal does with the different foods supplied to it, and how their utilization is affected by differences in the animal itself and in the conditions surrounding it. In other words, the Institute is pursuing a very practical end by methods which involve the use of highly elaborate appliances, but which, nevertheless, have the same logical basis as the simplest feeding experiment. While these methods are not the only ones which are adapted for research in animal nutrition, they are believed to be on the whole the best now available for the solution of the particular problems which are being attacked. The general nature of these methods may, perhaps, be most readily understood by considering the analogy between the animal and a machine.

Mechanically, the whole body of an animal is a very wonderful machine, but what is of peculiar interest in this connection is that the body is what the engineer calls a prime motor—that is, like the steam or gasoline engine it moves itself and may supply power to move other machines. In fact, there is in some respects a very close likeness between the animal body and what is known as internal combustion motors—i. e., those engines in which power is developed by burning liquid or gaseous fuel (gasoline, alcohol, producer gas, etc.) in the cylinder of the engine itself. Such an engine requires two things for its operation:—first, sufficient repair material to keep its working parts in running order; and second, a supply of fuel in proportion to the work to be done. Just these same two things are what the animal regarded as a machine requires—repair material and fuel.*

That the feed of the animal is its source of both repair material and fuel is sufficiently obvious. We do not need a physiologist to tell us that when an animal is deprived of food its tissues waste away and its fat is burned up in the effort to keep the bodily machinery in motion.

The repair material for the animal machine is the digestible protein and ash of its feed. These are the substances of which the working machinery of the body is composed, and the organism can no more produce them from the fats and carbohydrates of the feed than an automobile can manufacture repair material out of the gasoline supplied to it as fuel. But while a sufficient supply of protein to the animal body is indispensable the body, like a good engine, makes relatively small demands for repair material and requires chiefly fuel. It is this demand for fuel material and the means of supplying it which the Institute of Animal Nutrition is especially studying.

We can run an engine with various kinds of fuel. For the steam engine, e. g., we might use coal or wood or petroleum; for the internal combustion motor, gas, alcohol or gasoline might be employed. Similarly, we supply the animal body with a great variety of feeding stuffs from which it has to extract its supply of fuel, and even the materials which it actually burns up are of various sorts.

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*Of course, the animal, like the engine, requires proper shelter and skillful handling. We are considering here simply food requirements.

Fuel materials are not all of equal value. A pound of good anthracite coal, for example, is, other things being equal, about 14 per cent more valuable as fuel than the same weight of alcohol, while a pound of fat in the food has over twice the fuel value of a pound of starch. Evidently, it will greatly simplify comparisons of different feeding stuffs and rations as sources of fuel material to have some simple method by which we can learn not only the amount of fuel material which the feed contains but also the quality of that fuel. Such a basis of comparison is afforded by a study of the energy values.

Anything which has the capacity to do work is said to possess energy. Hence we say that the fuel of the engine and the feed of the animal possess energy, since they enable the engine or the body to do work. They hold this energy stored up in the "latent" or "potential" form of chemical energy. When they are burned in the engine or the body, this chemical energy is set free, part of it being converted into work and the rest escaping as heat. Plainly, then, the value of a fuel, or of a feeding stuff so far as it serves as fuel, depends, in the first place, on how much chemical energy it contains. This can be measured without difficulty by converting it all into heat, by burning the substance, and measuring the heat produced. Various units have been employed in measuring heat, but the one which seems best adapted for use in the study of feeding problems is the Therm. (Represented by the abbreviation T.)

A Therm is the quantity of heat required to raise the temperature of 1000 kilograms (2200 pounds) of water 1 degree Centigrade. A pound of good anthracite coal would produce heat enough to raise the temperature of about 3583 kilograms of water 1 degree C. Consequently, the chemical energy contained in the coal is 3,583 Therms per pound. In precisely the same way the amount of chemical energy contained in many feeding stuffs has been measured. The following are the results of a few such determinations.

### Chemical Energy in One Hundred Pounds*

| | |
|---|---|
| Timothy hay | 175.1 T |
| Clover hay | 173.2 T |
| Oats straw | 171.0 T |
| Wheat straw | 171.4 T |
| Corn meal | 170.9 T |
| Oats | 180.6 T |
| Wheat bran | 175.5 T |
| Linseed meal | 196.7 T |

*With 15 per cent. moisture.

But the value of a fuel depends also upon how much of the chemical energy which it contains can be utilized. Hard coal contains plenty of energy, but it would not be of much use to run a gasoline engine. Wheat straw contains fully as much chemical energy as corn meal but much of that energy cannot be used by the animal machine.

Two causes combine to affect the utilization of the chemical energy contained in feeding stuffs:

In the first place, more or less of the feed escapes from the body unburned. If a coal is of such quality that portions of it drop through the grate unconsumed, and if smoke and combustible gases are carried off through the stack, it is evident that a ton of it will supply far less heat to the boiler than it would if the combustion were perfect. The case of the feeding stuff is similar. Much of even the best feeding stuffs escapes digestion and is excreted in the dung, carrying with it a corresponding quantity of the chemical energy of the feed. More or less incompletely burned material is also contained in the urine, while ruminants, and to a certain extent horses, also give off combustible gases, arising from fermentations in the digestive tract. The amount of energy carried off in this way is very considerable. For example, about 22 per cent of the chemical energy of corn meal and fully 55 per cent of that of average hay, has been found to escape unused in the excreta.

In the second place, as already pointed out, the animal body has to extract its real fuel material from its feed, separating it from the relatively large proportion of useless material which it excretes. To effect this separation requires work and consumes energy, and this energy, of course, is not available for other purposes. The case is somewhat as if the gasoline engine had to distill its own gasoline and separate it from impurities. Moreover, when the animal eats more feed than is required simply to furnish energy to run its machinery, and hence is able to produce meat or milk, the process of converting the food into suitable forms to store up in the body seems to require a further expenditure of energy.

It is not, then, the total chemical energy contained in a feeding stuff which measures its value as fuel material to the body but what remains after deducting the losses in the unburned materials of the excreta and the energy expended in extracting the real fuel materials from the feed and transforming them into substances which the body can use or store up. For example, while one hundred pounds of corn meal contains, as stated, about 171 Therms of chemical energy, only about 89 Therms remain, after all these deductions have been made, to represent the actual value of the corn meal as a source of energy to the organism.

The Institute of Animal Nutrition is attempting to compare feeding stuffs for cattle by determining their relative values as sources of energy, measuring in the first place the total amount of energy contained in the feed and in the second place the amount of energy lost in the ways just indicated. For this purpose it is using an apparatus called a respiration calorimeter. The method is not unlike that employed by the Pennsylvania Railroad Company in its elaborate locomotive testing plant at Altoona, which some of you may have seen. In that plant a locomotive can be run at

any desired speed and with any desired load under conditions which permit of the exact determination of the total energy supplied in the coal burned and of the precise yield of useful energy, in the pull on the drawbar, at every point of each revolution of the drivers.

Experiments with the respiration calorimeter are made much after the same plan. The food, which is the fuel of the animal, is weighed and the exact amount of energy which it contains is determined. The losses in the visible excreta of the animal, corresponding to unburned coal dropping through the grate, and those in the unburned gases given off, are determined. Finally, the amount of energy escaping from the animal in the form of heat and likewise the gases given off in the respiration of the animal, are accurately measured. The tests are in some respects more elaborate than those of the locomotive because the animal is an infinitely more complex machine, but the final result is much the same, viz., to enable us to trace exactly the use which the animal makes of the energy supplied to it. We test the value of a feeding stuff by feeding it to the animal, but we measure the results far more exactly and minutely than is possible in the ordinary feeding experiment.

As an indication of the opinion of competent scientific authorities as to the value of the methods of investigation which the Institute is using, it may not be inappropriate in this connection to call attention to the laboratory which the Carnegie Institution of Washington has just established in Boston for the study of human nutrition by practically the same methods which are being used at the State College in the study of animal nutrition. The equipment of that laboratory has cost about $140,000, or about seven times that of the Institute of Animal Nutrition. Its annual income is at present about $25,000, and the Director tells me he expects that it will be nearly doubled within a few years.

Much of the work of the Institute still remains unpublished through lack of force in the past to complete the necessary analyses and computations and to prepare the results for publication. From those which have been published, however, I may select a few items simply as illustrations of the kind of information which may be secured by this method and which could not possibly have been obtained from the ordinary feeding experiment.

It has been shown, for example, that only a part of the actual fuel value of the feed (after making all the deductions for unburned material) is really of use to run the animal mechanism. Thirty-seven per cent of the fuel value of timothy hay was found to be converted directly into heat which is of use to the animal only when exposed to a comparatively low temperature. It is as if 37 per cent of the energy of the coal burned in a locomotive served only to keep the engineer and fireman warm and only 63 per cent helped to make steam. With corn meal, 78 per cent of the fuel value was of use to the animal and only 22 per cent contributed to this surplus heat production. Consequently, a pound of digestible matter derived from corn meal is 21 per cent more valuable to support the operation of the animal machine than the same weight of digestible matter derived from timothy hay, while for the production of gain the difference appears to be even greater (about 56 per cent).

A consequence of this surplus heat production is that the requirements of domestic animals for fuel material are less affected by external temperature than has been commonly supposed. On heavy feed the surplus heat generated is so considerable that exposure to moderate cold, far from harming the animals, is advantageous, at least in the case of fattening cattle, in helping them to get rid of the excess of heat. This has its bearing also on the question of stable ventilation. If well-fed animals can be comfortable and produce good economic results in a comparatively low temperature, it is obvious that we can have better ventilation than if we must, for economic reasons, maintain a comparatively high temperature.

Another interesting result, which could not have been demonstrated by the ordinary feeding experiment, is the largely increased heat production of the standing as compared with the lying steer. From 30 to 40 per cent more of the fuel value of the feed is consumed in the former case than in the latter and the operator can tell almost as exactly from the indications of the calorimeter when the animal stands up or lies down as by watching the animal. The bearing of this upon the economy of comfortable quarters and freedom from disturbance is too obvious to require discussion.

Besides a study of various feeding stuffs as sources of energy to the animal, the Institute has also under way investigations upon some of the factors which influence the efficiency of the animal machine in converting crops into animal products. For example, the records of three years' work upon the influence of the age and type of beef steers upon the economy of gain are now being studied and prepared or publication.

But the final test of the results of any line of investigation is not their unusual or striking character but their capacity for being put to practical use. Service is always the real test of value. Do these studies of energy values yield results which can be used in actual feeding?

I believe that they do. While very much remains to be learned before we can claim to have even a fairly complete knowledge of the energy relations of the feed, enough has been accomplished in the past twenty-five years by the investigations of Rubner, Zuntz, Kellner and others in Europe and those of Atwater, Rosa, Woods, Benedict, and I think I may add our own, in this country, to demonstrate that the method still generally current of comparing feeding stuffs on the basis of the digestible matter which they contain is seriously erroneous and to furnish at least the beginnings of a reform.

Even did time permit, however, I could hardly venture to trespass upon your patience by undertaking on this occasion to show in detail how our present knowledge of the energy values of feeding stuffs and the energy requirements or farm animals can be applied in the actual computation of rations. Instead, I have assumed "leave to print," and refer you for a discussion of this branch of the subject to Farmers' Bulletin No. 346 of the U. S. Department of Agriculture, just published, in which I have tabulated the best available data as to the energy values of the more important feeding stuffs and have attempted to formulate the feed requirements of the various classes of farm animals in terms of protein and energy and to show how these data can be used in the computation of rations.

A perusal of this bulletin will make it apparent that so far as the arithmetical side of the matter is concerned the method of computation does not differ materially from that already in use and familiar to you all, except that it is perhaps a little more simple. It is merely applied to more exact data.

I have attempted to show that the problems upon which the Institute of Animal Nutrition is working are highly important ones; although elaborate, are distinctly practical in aim and are adapted to the solution of practical problems; and that the results are likely to be valuable in practice because those of similar investigations elsewhere have already proved their worth.

It must be admitted, however, that the advocate of scientific investigation is at a certain disadvantage when the question of the returns for the money expended is raised.

The experimenter who introduces a new crop or produces an improved variety finds it easy to show the financial value of his results. The entomologist who devises a new spraying material can demonstrate immediate advantages from its use. The agronomist who studies the fertilizer requirements of a soil type incorporates his results in bushels or tons of crop increase. These are the inventors in the field of agriculture, and their services have been priceless. On the other hand, the investigator who is endeavoring primarily to discover fundamental principles and laws finds it less easy to demonstrate tangible results. His products are ideas in the mind of the farmer rather than crops in his fields. He aims to assist the agriculturist to a better knowledge of his business rather than to give him specifics for this or that difficulty. The benefits resulting from such service are as intangible and as difficult to express in dollars and cents as are those of the public school system, yet who can doubt that if, for example, the owners of the hundred million dollars worth of live stock on the farms of Pennsylvania could be helped to a measurably better knowledge of the nature and mode of operation of the machines called animals which they are using the economic result to the State would amply justify the necessary expenditure?

I called attention a few months ago to the analogy between the respiration calorimeter and the locomotive testing plant of the Pennsylvania Railroad. That testing plant cost over $120,000. It would seem that the locomotive is such a well known machine that all that would be necessary to test its efficiency would be simply to put it out on the road, just as we might be inclined to suppose that all that is necessary to determine the efficiency of the steer or the cow is to feed it in the barn, and yet the Pennsylvania Railroad Company thinks it has paid well to spend $120,000 on a testing plant and other thousands in making highly scientific tests of this familiar machine. The Engineer of Tests says: "We are entirely satisfied that this investment and the cost of operation represent moneys wisely spent, as we are learning facts about locomotive performance which are of extreme value and which are the means of pointing out the way to obtain direct saving in the operation of the Pennsylvania Railroad." As compared with the animal machine, however, the locomotive is an extremely simple thing. I hope that I have at least succeeded in indicating to you that it is possible by tests of the animal to learn facts about animal performance which will be of extreme value to the stockmen of Pennsylvania, and which will point out the way to obtain direct saving in the operation of the farms of the Commonwealth.

The Pennsylvania Railroad owns locomotives to the value in round numbers of thirty-one million dollars. The value of the live stock on the farms of Pennsylvania is over one hundred million dollars. If it pays the Pennsylvania Railroad to permanently invest $120,000 to test the operation of thirty-one million dollars worth of locomotives, how much will it pay the Commonwealth of Pennsylvania to invest in testing the operation of its one hundred million dollars worth of live stock? An investment corresponding to that of the Railroad Company would be $397,000.

The Pennsylvania Railroad estimates the physical value of its property, including cost of road, real estate, equipment and terminal property at two hundred and ninety million dollars. The value of the farm property in Pennsylvania is put by the last census at more than a thousand million dollars. An investment in an animal testing plant in proportion to that of the railroad company in its locomotive testing plant would amount to $434,000.

The gross income of the railroad company last year was fifty million dollars. The gross income of the farms of the state, as represented by the value of farm products, is over two hundred million dollars. On the basis of income, therefore, a proportionate investment in an animal testing plant would amount to $499,000.

It appears, then, that whether we base the comparison on the value of the equipment to be tested, upon the total value of the property or upon the gross receipts of the business, an investment by the state comparable to that of the Pennsylvania Railroad Company would be from $400,000 to $500,000. Three-quarters of that sum invested at 5 per cent would permanently endow the Institute of Animal Nutrition and put its work on a sound and fairly satisfactory basis.

Now it is for you, and for the farmers of the State generally, to say whether you want these investigations in animal nutrition continued. Legislators, Governors and Trustees alike are simply your representatives.

So far as the Trustees of the College are concerned there can be no question as to their attitude. I do not know, of course, what they will do in the future, but I do know what they have done in the past. For the last two years, although they have had no specific appropriation for this work and have been compelled to face serious financial difficulties they have nevertheless said: "Go on with the work, pay the necessary salaries, order the absolutely essential equipment, and we will in some way find the means to pay for it." In the light of this exceedingly practical expression of their judgment as to the importance of the work, I have not the slightest doubt as to what they will wish to do. What they can do will depend to a very large extent upon the support which they receive before the Legislature and the Governor from you and those whom you represent.

The authorities of the Commonwealth of Pennsylvania are not stingy. They desire to deal liberally with the agricultural interests. But it is your money which they are expending and they would be false to the trust reposed in them if they did not inquire whether the objects of expenditure proposed to them are such as you approve. The particular institution for agricultural research which I represent here, like every other, while it must ask the farmer to take some things on trust and to have faith in the ultimate usefulness of scientific results, must make its final appeal to the sober, common-sense judgment of the plain people. Gentlemen, the responsibility for the future of these investigations rests with you.

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# THE CORN SHOW

There was a magnificent display of corn in competition for the cups and cash prizes offered by the Pennsylvania Live Stock Breeders' Association and its friends. A double row of tables extending the entire length of the great skating rink showed the grain, but not without some crowding. The photograph on next page shows the exhibit, but fails to give an adequate idea of its length.

Prof. F. A. Gardner, of Pennsylvania State College, with Dean Thos. F. Hunt in consultation, made the awards, which are given in full below. An interesting fact was that the Grand Champion award went to corn of the same variety and strain as that which won first and second and the championship the previous year under another judge. It was a hard task to decide the ear championship, an ear from Mr. Strosnider's champion lot of Leaming and an ear from Mr. Eisiminger's third prize lot of Funk's Leaming causing the trouble, and also being responsible for the error in press reports as to the results. Mr. Eisiminger's ear was finally decided to have a fraction the best of it. Entry blanks showing the name of variety, source of seed, time of planting, cutting, fertilizer used, character of soil, elevation above sea level, original tree growth on soil, etc., gave information to all after the awards had been made. The prize corn was auctioned off Thursday afternoon. The champion ear was sold by Prof. C. W. Burkett after a stirring speech on seed corn. The purchaser was Samuel R. Ludwig, of New York City, and the price $15. The Grand Champion corn went to Dr. J. Stewart Lacock, of Pittsburg, for $20, he presenting it to the Pennsylvania Test Farm. The second prize Yellow Dent corn, a splendid specimen from Chester county, brought $15. The Yellow Dent class was so large that it was quite an honor to get in the first ten places. So much corn was received that could not be strictly classed as Yellow Dent or White-Capped Yellow Dent that a new class was made and this corn entered there, as it had no chance to win in other classes. The Grange Show was confined to one Grange, and no cups were awarded.

Yellow Dent—First, George G. Strosnider, Waynesburg (Silver Cup presented by Dr. Thomas Turnbull, Pittsburg); second, G. Martin Cloud, Kennett Square; third, Jesse L. Eisiminger, Waynesburg; fourth, J. R. Fritz, Duncannon; fifth, William H. Grim, Hamburg; sixth, C. B. McConnell, Sharpsville; seventh, Clarence Mellinger, Ronk; eighth, J. B. Henderson, Burgettstown; ninth, Harry E. Dietz, Mechanicsburg; tenth, C. L. Taggart, Washington.

White Dent—First, Charles A. Row, Yardley (Silver Cup presented by the Faculty of the Veterinary College of the University of Pennsylvania, Philadelphia); second, G. A. Trimmer, Mechanicsburg; third, L. W. Kintigh, Irwin; fourth, Lee L. Trimmer, Mechanicsburg; fifth, C. H. Deckard, Newport; sixth, S. E. Musselman, Allen; seventh, W. M. Thompson, Uniontown; eighth, Evan R. Styer, Glenmoore; ninth, George O. Souder, Dillsburg; tenth, A. C. Slifer, Lewisburg.

White-Capped Yellow Dent—First, J. P. Dentler, Turbotville (Silver Cup presented by Faculty of Pennsylvania Agricultural College, State College, Pa.); second, A. T. Holman, Millerstown; third, Harry B. Herr, Lancaster; fourth, Chas. A. Row, Yardley; fifth, A. C. Slifer, Lewisburg; sixth, Jasper M. Thompson, Uniontown; seventh, James W. McCann, Fredonia; eighth, H. M. Welton, Sandy Lake; ninth, F. W. Levis, Chadd's Ford; tenth, Estate of Samuel J. S. Sharpless, Westtown.

Ninety-Day Type—First, Post Bros., West Alexander (Silver Cup presented by Department of Agriculture, Harrisburg, Pa.); second, G. Martin Cloud, Kennett Square; third, B. F. Gabler & Son, Greensboro; fourth, G. A. Trimmer, Mechanicsburg; fifth, Harry C. Trexler, Allentown; sixth, F. G. & W. A. McCoy, Mercer; seventh, W. T. Phillipy, Carlisle; eighth, J. H. Allison, Mercer; ninth, Anna C. Betts, Buckmanville; tenth, Fred Backhaus, DeHaven.

Flint—First, J. H. Ferris, Little Marsh (Silver Cup presented by Hon. Vance C. McCormick, Harrisburg, Pa.); second, Harry Rockwell, Canton; third, Joseph C. McCann, Fredonia; fourth, J. H. Bostwick, Jackson Center; fifth, Oliver D. Spencer, Wellsboro; sixth, C. E. Bronson, Alderson; seventh, J. H. Bowman, Towanda; eighth, J. D. McKnight, Bakerstown; ninth, C. F. Reynolds, Tioga; tenth, John J. Ayers, Gillett.

Mixed Varieties—First, G. W. Tilton, Claysville (Silver Cup presented by Hon. Vance C. McCormick); second, S. E. Musselman, Allen; third, A. B. Grove, Chambersburg; fourth, Harry B. Herr, Lancaster; fifth, Paul M. Bitner, Shiremanstown.

Grand Champion—Best ten ears in show—George G. Strosnider, Waynesburg. (Cup presented by The American Agriculturist, New York, N. Y.)

Best Ear in Show—Jesse L. Eisiminger, Waynesburg. (Plate presented by R. F. Shannon, Pittsburg, Pa.)

## Reports of Corn Growers.

Unfortunately many of the entry blanks containing information about the corn on exhibition were lost in the confusion incident to the sale of the prize corn. The following winners of leading prizes, in response to request made by mail, have sent in blanks subsequent to the show:

### Grand Champion Ten Ears.

George G. Strosnider, Waynesburg, Greene county, Pa.:

Name of variety—Improved Leaming.

Source of seed—J. S. McNary, 1885.

When planted—May 10th.

When cut—October 1st.

Fertilizer or manure used, kind and quantity per acre—Straw; plowed under.

Elevation above sea level (if known)—About 1,000 feet.

Character of soil—Limestone, rolling.

Character of original tree growth—Sugar, Walnut.

Mr. Strosnider has bred this strain of corn since 1885, when he got the seed. It is now much larger than original seed, which Mr. McNary got from the originator of the Leaming corn.

### Second Prize Yellow Dent.

G. Martin Cloud, Kennett Square, Pa., makes the following report:

Source of seed—Own seed for 28 years.

When planted—May 14th.

When cut—About September 20th.

Fertilizer or manure used, kind and quantity per acre—No manure. (Barn was burned and had no manure.) 200 pounds steamed bone.

Elevation above sea level (if known)—450 feet.

Character of soil—Gravelly clay loam, with clay subsoil well drained, mostly flint stone.

Character of original tree growth—Chestnut, white and black oak.

### White Dent—First Prize.

Chas. A. Row, Yardley, Bucks County, Pa., who won first prize in the class for White Dent, makes the following report:

Name of variety—Boone County Special.

Source of seed—Illinois.

When planted—May 5th.

When cut—September 25th to 30th.

Fertilizer or manure used, kind and quantity per acre—Barn-yard manure; 250 pounds of high-grade fertilizer per acre.

Elevation above sea level (if known)—100 feet.

Character of soil—Loam, granite (native). Natural drainage, very good.

Character of original tree growth—Oak and chestnut.

Mr. Row adds:—

"The White Cap Yellow Dent which won fourth prize was grown under the same conditions, except that the seed has been saved by us for years. We would like to be with you another year if possible."

### White Dent—Second Prize.

G. A. Trimmer, Mechanicsburg, Cumberland county, makes the following report:

Name of variety—Snow-White Dent.

Source of seed—Grown by self.

When planted—Middle of May.

When cut—Middle of September.

Fertilizer or manure used, kind and quantity per acre—Barn-yard manure and 150 pounds commercial fertilizer.

Elevation above sea level (if known)—450 feet.

Character of soil—Slate, rolling, well drained; chestnut loam, with flint rock.

Character of original tree growth—Chestnut.

### White Capped Yellow Dent—First Prize.

Mr. J. P. Dentler, Turbotville, Northumberland county, who exhibited corn successfully at all of our shows, died May 31st. The following report of his corn was made for the show and duplicated later by Mrs. Dentler:

Name of variety—White Cap Yellow Dent.

Source of seed—From own farm.

When planted—May 13th.

When cut—September 7th.

Fertilizer or manure used, kind and quantity per acre—Barn-yard manure.

Character of soil—Limestone, well drained; rolling, not hilly.

Character of original tree growth—Oak.

October 30 shelled and hauled to market.

### White Capped Yellow Dent—Second Prize.

A. T. Holman, Millerstown, Perry county, winner of second prize, makes this report:

Name of variety—White Cap Yellow Dent.

Source of seed—Home-grown.

When planted—May 13, 1908.

When cut—October 1st.

Fertilizer or manure used, kind and quantity per acre—Clover sod.

Elevation above sea level (if known)—500 feet.

Character of soil—Limestone clay.

Character of original tree growth—Oak.

### Ninety-Day Type.

G. Martin Cloud, winner of second prize, reports:

Source of seed—Own seed for 25 years. (Originally from New York.)

When planted—May 14th.

When cut—About September 1st.

Fertilizer or manure used, kind and quantity per acre—200 pounds of steamed bone.

Elevation above sea level (if known)—450 feet.

Character of soil—Gravelly clay loam with clay subsoil, well drained; mostly flint stone.

Character of original tree growth—Chestnut, white and black oak.

### Mixed Varieties—First Prize.

G. W. Tilton, Claysville, Washington county, writes:

"In regard to the corn on which I received first prize at Harrisburg it is a result of my own personal experimenting for several years. I first started with three of the best varieties I could find, namely: Chester County Mammoth Early Dent, the Improved Leaming and the Arlington. My aim from the first was to obtain a long ear with deep, broad grains and a moderate size cob that would mature in a reasonable length of time. The stalk is large and strong with abundance of foliage and deep-seated roots. I have carried out my aims and find that only a large, strong stalk is capable of producing a large ear, and by so doing have raised ears measuring 15 inches long with half-inch grains. The land from which I received my prize corn was on a hillside facing the northeast, and is about 1,400 feet above sea level. The soil is a mixture of sandstone and limestone, but the majority of this field was limestone. I used no fertilizer of any kind. I did not plow the field early but ploughed to the depth of eight inches. The ground was put in fine shape before planting and then planted on May 20, in rows 3 feet, 4 inches apart, drilling one grain every 15 inches in the row. I cultivated the corn shallow four times, the last time being when the corn was 5 feet high, just after cutting wheat, and consider the last working did more good than the other three, but of course the corn must have these as well as the last one. The corn was cut on September 14th; husked and cribbed in fine shape by October 20, 1908."

S. E. Musselman, Allen, Pa., reports:

Name of variety—Mammoth.

When planted—May 12th.

When cut—September 24th.

Fertilizer or manure used, kind and quantity per acre—None.

Elevation above sea level (if known)—Near Harrisburg.

Character of soil—Limestone and sand.

### Flint—First Prize.

J. H. Ferris, Little Marsh, Tioga county, says that his corn was cultivated seven times and hoed once, and reports as below :

Name of variety—Improved Dutton.

Source of seed—Raised on farm.

When planted—May 28, 1908.

When cut—September 15, 1908.

Fertilizer or manure used, kind and quantity per acre—Manure, seven loads.

Elevation above sea level (if known)—1,400 feet.

Character of soil—Sod ground plowed in the spring; sandy loam.

### Flint—Second Prize.

Harry Rockwell, Canton, Bradford county, writes:

Our corn ground was ploughed in the fall and manured in the winter and early spring, harrowed three times before planting, given good cultivation. Level culture was followed. Corn was cut and shocked in the usual way and husked in the field.

Name of variety—Smoky Valley.

Source of seed—Home-grown.

When planted—May 22nd.

When cut—September 4th.

Fertilizer or manure used, kind and quantity per acre—Stable manure, eight loads per acre.

Character of soil—Red shale, well drained, gravelly.

Character of original tree growth—Pine.

## OTHER CORN WORK.

The Pennsylvania Live Stock Breeders' Association, realizing that the great corn problem is to produce more corn per acre, has inaugurated a Corn-Growing Contest under the following conditions and regulations:

For the Best Acre of Corn. Any Type or Variety, Grown by a Pensylvania Farmer in 1909.

CONDITIONS.

1—In awarding prizes yield shall count 70 points; cost of production 20 points; sample of corn shown at Annual Corn Show 5 points; completeness and accuracy of report 5 points.

2—This contest is open to any Pennsylvania farmer, his son, daughter, ward or employe. Seedsmen and their families and employes are barred.

3—One measured acre, either a part of a field or separate, must be entered. This acre must be completely surrounded by at least one row of corn not more than 3 feet 8 inches from the boundary of the measured acre.

4—The contestant has entire freedom in preparation of ground, use of fertilizers, seed, planting, cultivation, etc.

5—The corn on the measured acre shall be husked standing after all corn adjoining it shall have been cut and shocked or removed.

6—The corn shall be husked and weighed in the presence of two witnesses approved by the Secretary of the Pennsylvania Live Stock Breeders' Association. But corn shall not be husked until said witnesses shall certify that it is fit to crib along with main crop.

7—Fifteen ears of the crop shall be exhibited at the Fourth Annual Corn Show of the Pennsylvania Live Stock Breeders' Association, due notice of which will **be given.**

8—Judges: Dean Thos. F. Hunt and Prof. F. D. Gardner, Pennsylvania Agricultural College.

Names of witnesses should be submitted for papproval to E. S. Bayard, 203 Shady Avenue, Pittsburgh, in plenty of time to forward them their instructions.

Entry blanks, forms for report, etc., will be furnished all contestants.

E. S. BAYARD, Sec'y.
203 Shady Ave., E. E., Pittsburgh, Pa.

### Thirty in Contest.

Thirty farmers are growing an acre apiece in this contest, and the corn will be shown and reports made at the next annual meeting. Three gentlemen are also testing Mr. Strosnider's Grand Champion corn, he having kindly furnished them the seed free. Their reports will also be made at the next annual meeting.

## Suggestions Wanted.

The Secretary realizes that previous shows of corn have been far from perfect and has endeavored to profit by suggestions made. The making of equitable rules for a corn-growing contest has been no easy task, and suggestions are in order here also.

We ought to have a thousand Pennsylvania farmers growing an acre of corn, keeping a record of its cost and showing their product and their records annually, instead of thirty. If the fault lies in the rules or conditions of the contest we want to know it. It has been found impossible, on account of variation in altitude, to district the state so that all growers might compete on a more nearly equal basis.

## HORSES.

### PERCHERONS.

Name. Postoffice. County.
J. H. Kidd......................Mars, Butler
D. S. Kloss....................Tyrone, Blair
A. M. Dickson & Son.Cochranton, Crawf'd
Geo. A. Hogg..24th & R. R. Sts., Pittsburg
F. W. & W. A. McCoy....Mercer, Mercer
Powell Bros..........Shadeland, Crawford
Wm. F. Gable..........Wyebrook, Chester
H. M. Lyon & Sons..Wyalusing, Bradford
J. F. Lantz & Co.......Glenmoore, Chester
Nelson Poorbaugh.Mt. Pleasant, Westm'd

### STANDARD-BRED.

Peter B. Cowan........ ....Brookville, Jeff.
W. C. Norton............Waymart, Wayne
Jas. Blair (Carriage type).Hartstown,Crf'd
Henry Palmer............Avondale, Chester
Powell Bros..........Shadeland, Crawford

### SHIRE.

Geo. A. Hogg..24th & R. R. Sts., Pittsburg
Powell Bros..........Shadeland, Crawford

### SHETLAND PONIES.

Wm. F. Gable..........Wyebrook, Chester
W. M. Thompson.....Uniontown, Fayette
Powell Bros..........Shadeland, Crawford

### HACKNEYS.

Geo. A. Hogg..24th & R. R. Sts., Pittsburg
Powell Bros..........Shadeland, Crawford

### THOROUGHBREDS.

R. S. Hartley........Youngsville, Warren

### BELGIAN.

Powell Bros..........Shadeland, Crawford
W. H. Baldridge..Latrobe, Westmoreland
Benj. B. Baird..McClellandtown, Fayette

### CLYDESDALE.

Powell Bros..........Shadeland, Crawford
G. W. Carroll & Sons.Jackson Centre, Mcr
Penshurst Farm...Narberth, Montgomery

### ARABS.

Herman Hoopes.....Westchester, Chester

### MORGANS.

Geo. A. Hogg..24th & R. R. Sts., Pittsburg
A. R. Van Tassel.......Dubois, Clearfield

### CLEVELAND BAY.

Powell Bros..........Shadeland, Crawford

### FRENCH COACH.

Powell Bros......... Shadeland, Crawford

### SUFFOLK PUNCH.

Powell Bros..........Shadeland, Crawford

### FRENCH DRAFT.

Powell Bros..........Shadeland, Crawford

## CATTLE.

### ABERDEEN-ANGUS.

C. L. Taggart...Washington, Washington
Jas. Blair.............Hartstown, Crawford
Bayard Bros..........Waynesburg, Greene
Geo. Black.............Dayton, Armstrong

### AYRSHIRES.

W. W. Blake Arkcoll.......Paoli, Chester
E. L. & Sidney Roberts..Malvern, Chester
Geo. A.. Dick................Kane, McKean
W. F. Throop..Espyville Station, Crawf'd
Penshurst Farm...Narberth, Montgomery

### BROWN SWISS.

W. H. H. Riddle............Butler, Butler
A. M. Dickson & Son.Cochranton, Crawf'd

### DEVONS.

A. S. Worden...............Frederick, Md.
Powell Bros...........Shadeland, Crawford

### POLLED ALBIONS.

B. E. Ferris.................Hector, Potter

### HOLSTEINS.

Herman Straub......Pittsburg, Allegheny
T. J. Erdley.............Lewisburg, Union
W. T. Suter...Riverside, Northumberland
H. M. Lyon & Sons..Wyalusing, Bradford
J. B. Henderson..Burgettstown, Wash'g'n
A. S. Worden...............Frederick, Md.
Geo. G. Paxton.....Houston, Washington
D. S. Kloss.....................Tyrone, Blair
J. M. Quivey & Son.Houston, Washington
Powell Bros...........Shadeland, Crawford
D. E. Notestine.........Lewistown, Mifflin
Nelson Poorbaugh....Mt. Pleasant, West'd
F. W. Levis........Chadd's Ford, Chester
W. M. Benninger..Benningers, North'pt'n
W. F. Throop..Espyville Station, Crawf'd

### POLLED DURHAMS.

Lee R. Scott..Burgettstown, Washington

### HEREFORDS.

G. W. Carroll & Sons.Jackson Centre, Mcr

### RED POLLS.

M. G. King..................Mt. Wolf, York
A. M. Dickson & Son.Cochranton, Crawf'd
D. Norman App.......Selinsgrove, Snyder
John F. Zook............Belleville, Mifflin
Sidney T. Isett..Spruce Creek, Huntingdon

### SHORTHORNS.

W. J. Sturgeon.....Kittanning, Armstrong
C. A. Hershey................Tillie, Adams
W. M. Thompson.....Uniontown, Fayette

John A. Cummins....Waynesburg, Greene
J. L. Stouffer...Southwest, Westmoreland
A. S. Eagleson & Sons.Washington, Wash.
W. J. Monroe..Greensburg, Westmoreland
W. C. Black.................Mercer, Mercer
Post Bros..........West Alexander, Wash.
F. W. & W. A. McCoy....Mercer, Mercer
Lee R. Scott...Burgettstown, Washington
L. D. May......Granville Center, Bradford
R. C. Vance...Burgettstown, Washington
R. L. Munce.....Canonsburg, Washington
Benj. B. Baird...McClellandtown, Fayette

### GUERNSEYS.

W. H. Ridge.................Trevose, Bucks
R. S. Nicholson & Sons.Kittanning, Arm'g
B. F. Gabler & Son....Greensboro, Greene
Nelson Poorbaugh..Mt. Pleasant,Westm'd
Wm. F. Gable..........Wyebrook, Chester
R. S. Hartley.........Youngsville, Warren
H. H. Snavely...Willow Street, Lancaster
Geo. G. Paxton.....Houston, Washington
Henry Palmer...........Avondale, Chester
R. S. Love....Mt. Pleasant, Westmoreland
Shook Bros............Spring Mills, Center
Ezra Michener............Michener, Bucks
H. D. Conley..................Etters, York
J. F. Lantz & Co......Glenmoore, Chester

### JERSEYS.

R. S. Love....Mt. Pleasant, Westmoreland
R. S. Nicholson & Sons.Kittanning, Arm'g
Jno. W. Bronson.....New Galilee, Beaver
R. Y. Filbert...................Philadelphia
W. F. Shrum....Jeannette, Westmoreland
M. P. Shoemaker & Bro.Greensburg, West.
R. S. Hartley.........Youngsville, Warren
W. E. & J. J. Perham.....Niagara, Wayne
W. C. Norton............Waymart, Wayne
S. E. Nivin..........Landenburg, Chester
W. F. Wagner....Harrison City, Westm'd
Herman Hoopes.....Westchester, Chester
W. W. Harrison.119 N.11th St.,Philadelphia
R. F. Shannon............Pittsburg, All'y
J. B. Wylie.......Washington, Washington
J. H. Silvis.....Greensburg, Westmoreland
B. P. Steele............McVeytown, Mifflin
Penshurst Farm...Narberth, Montgomery

## SHEEP.

### BLACTOP MERINOS.

John M. Berry..Wylandville, Washington
R. L. Munce.....Canonsburg, Washington

### DELAINE MERINOS.

Geo. G. Paxton.....Houston, Washington
Lee R. Scott..Burgettstown, Washington
R.W.Crothers & Son...Taylorstown, Wash.
A. L. Martin.......Enon Valley, Lawrence

### CHEVIOTS.

A. M. Dickson & Son..Cochranton. Crawf'd

### SOUTHDOWNS.

R. Y. Filbert.....................Philadelphia
F. W. & W. A. McCoy....Mercer, Mercer
R. C. Vance....Burgettstown, Washington
W. M. Benninger...Benningers, North'p'n

### DORSETS.

A. S. Eagleson & Son.Washington, Wash.
J. B. Henderson..Burgettstown, Wash'g'n
S. Shaffer...........New Castle, Lawrence
J. B. Wylie......Washington, Washington
Henry Palmer...........Avondale, Chester

### SHROPSHIRES.

J. F. Lantz & Co......Glenmoore, Chester
Wm. F. Gable..........Wyebrook, Chester
C. A. Hershey..................Tillie, Adams
S. Shaffer...........New Castle, Lawrence
Jos. T. Fleming...........Belleville, Mifflin
W. C. Black.................Mercer, Mercer
Sidney T. Isett..Spruce Creek, Huntingd'n
Herman Hoopes.....Westchester, Chester
D. S. Kloss....................Tyrone, Blair
D. W. Jones..............Wilmore, Cambria
B. P. Steele............McVeytown, Mifflin
Penshurst Farm...Narberth, Montgomery

### LINCOLNS.

R. S. Nicholson & Sons.Kittanning, Arm'g
F. W. & W. A. McCoy.....Mercer, Mercer

### HAMPSHIRES.

W. J. Monroe..Greensburg, Westmoreland
Jas. Blair.............Hartstown, Crawford
A. M. Dickson & Son..Cochranton, Craw'd
John F. Zook.............Belleville, Mifflin

### COTSWOLDS.

R. S. Love....Mt. Pleasant, Westmoreland

### TUNIS.

A. M. Dickson & Son..Cochranton, Craw'd

### OXFORDS.

A. M. Dickson & Son..Cochranton, Craw'd
A. S. Worden................Frederick, Md.

### SPANISH MERINOS.

Lee R. Scott...Burgettstown, Washington

### LEICESTERS.

F. W. & W. A. McCoy.....Mercer, Mercer

### SUFFOLK.

A. M. Dickson & Son..Cochranton, Craw'd

### BLACKFACED HIGHLAND.

A. M. Dickson & Son..Cochranton, Craw'd

### ANGORA GOATS.

R. S. Love....Mt. Pleasant, Westmoreland
A. M. Dickson & Son..Cochranton, Craw'd

## POULTRY.

### PLYMOUTH ROCKS.

Edwin Johnson.........Taylorsville, Bucks
Jno. W. Bronson (B)..New Galilee, Beaver
Herman Straub (B)..Pittsburg, Allegheny
W. T. Kennedy.................Mars, Butler
W. J. Monroe (B)......Greensburg, West'd
W. T. Suter (W)....Riverside, Northumb'd
M. N. Clark (B)..Claridge, Westmoreland
J. F. Lantz & Co.....Glenmoore, Chester
D. N. App (B&W)....Selinsgrove, Snyder
C. A. Hershey (B).............Tillie, Adams
M.P.Shoemaker&Bro.(W).Greensbg, West.
H. M. Lyon & Sons(B)..Wyalusing, Bradf'd
D. W. Jones.............Wilmore, Cambria
Geo. S. Barnhart....Greensburg, Westm'd
Sydney T. Isett.Spruce Creek, Huntingdon
John A. Cummins(B).Waynesburg, Greene
W. F. Wagner (B)..Harrison City, West'd
J. L. Stouffer (B).....Southwest, Westm'd
Jos. T. Fleming (Wh)....Belleville, Mifflin
Burns & Adams (B)...Imperial, Allegheny
J. H. Peachey (B)........Belleville, Mifflin
Herman Hoopes (B)..Westchester, Chester
A.S.Eagleson&Sons(B).Washingt'n, Wash.
R. S. Love (W).....Mt. Pleasant, Westm'd
J. H. Silvis...Greensburg, Westmoreland
D. E. Notestine.........Lewistown, Mifflin
Shook Bros............Spring Mills, Center
F. W. & W. A. McCoy(Wh).Mercer, Mercer
W. M. Benninger (Wh).Benningers, N'th'n
Penshurst Farm (B)...Narberth, Montg'y
A. L. Martin.......Enon Valley, Lawrence

### COCHINS.

John M. Berry (Wh)..Wylandville, Wash.

### RHODE ISLAND REDS.

R. F. Shannon (R.C.).....Pittsburg, All'y
W. H. Knarr (S.C.)..Greensburg, Westm'd
D. Norman App........Selinsgrove, Snyder
D. W. Jones.............Wilmore, Cambria
S. Shaffer...........New Castle, Lawrence
W. W. Blake Arkcoll.......Paoli, Chester
B. P. Steele (B.C.).....McVeytown, Mifflin
W. J. Sturgeon....Kittanning, Armstrong

### ORPINGTONS.

Geo. Black (Bf)........Dayton, Armstrong

### WYANDOTTES.

Dr. Carl W. Gay(Bf).Swarthmore,Delaw'e
S. Shaffer (Wh).....New Castle, Lawrence
R. S. Nicholson & Sons.Kittanning, Arm'g
Herman Straub(Wb)..Pittsburg, Allegheny
R.W.Crothers & Son(W).Taylorst'n, Wash.
Wm. F. Gable (Bf).....Wyebrook, Chester
C. A. Hershey (Wh)..........Tillie, Adams
D. W. Jones (Wh)........Wilmore, Cambria
H. H. Snavely (Wh).Willow St., Lancaster
D. S. Kloss (Wh)..............Tyrone, Blair
Ezra Michener (C&Wh)...Michener, Bucks
R. S. Love (W).Mt. Pleasant, Westmorel'd
Penshurst Farm (Wh)..Narberth, Montg'y

### HAMBURGS.

Dr. Carl W.Gay(SS).Swarthmore,Delaware

### MINORCAS.

Wm. F. Gable..........Wyebrook, Chester
R. S. Hartley..........Youngsville, Warren
R. F. Shannon(Bl)..Edgeworth Sta., Ally.

### BRAHMAS.

J. D. Nevius (Lt)....Philadelphia, Phila.

### LEGHORNS.

R. F. Shannon (Bl)..Edgeworth Sta., Ally.
W. T. Suter (RCW).Riverside, Northum'd
G. S. Barnhart (Bf)..Greensburg, West'd
R. L. Munce (SC)......Canonsburg, Wash.
Nelson Poorbaugh(Wh).Mt.Pleasant,West.
M. P. Shoemaker & Bro.(Br)..Greensburg
R.S.Hartley (Bf&Br)..Youngsville, Warren
Post Bros (RCB)...W. Alexander, Wash.
R. S. Love (W)....Mt. Pleasant, Westm'd
Jos. T. Fleming (SCB)..Belleville, Mifflin
Dr. Carl W. Gay (SC)..Swarthmore, Del.
W.F.Throop(SCW).Espyville Sta., Cr'wf'd

### BANTAMS.

R. S. Hartley (Bf C)..Youngsville, Warren

### GAMES.

Dr. Carl W. Gay..Swarthmore, Delaware
Herman Hoopes......Westchester, Chester
Post Bros......West Alexander, Wash'g'n

### PEAFOWLS.

F. W. & W. A. McCoy.....Mercer, Mercer
D. W. Jones.............Wilmore, Cambria

### GUINEAS.

R. S. Nicholson & Sons..Kittanning, Arm'g

### DUCKS.

G. I. Fugate (Mus)......Ellsworth, Wash.
F. W. & W. A. McCoy (Pekin).Mercer, M'r

### TURKEYS.

Jno. M. Berry (WhH)..Wylandville, Wash.
D. N. App (WhH).....Selinsgrove, Snyder
J. L. Stouffer (MB)...Southwest, Westm'd
J. B. Wylie (WhH)...Washington, Wash.
F. W. & W. A. McCoy(WH).Mercer. Merc'r
D. W. Jones (MB)........Wilmore, Cambria

### GEESE.

W. J. Monroe (Tou)...Greensburg, West'd

### BLUE SPANISH.

G. I. Fugate........Ellsworth, Washington

## SWINE.

### BERKSHIRES

Jno. W. Bronson.....New Galilee, Beaver
T. J. Erdley..............Lewisburg, Union
W. T. Kennedy...............Mars, Butler
J. H. Silvis....Greensburg, Westmoreland
A. L. Martin.......Enon Valley, Lawrence
A. S. Worden.................Frederick, Md.
R. W. Crothers & Son..Taylorst'n, Wash.
Nelson Poorbaugh.Mt. Pleasant, Westm'd
Jas. L. Henderson..Washington, Wash't'n
Geo. A. Dick................Kane, McKean
W. C. Black..................Mercer, Mercer
R. F. Shannon.......Pittsburg, Allegheny
A. S. Eagleson & Sons..Washington, Wash.
T. J. Erdley..............Lewisburg, Union
W. M. Benninger...Benningers, North'p'n
Penshurst Farm...Narberth, Montgomery
John A. Cummins....Waynesburg, Greene

### DUROC-JERSEYS.

Post Bros..........West Alexander, Wash.
George Black............Dayton, Armstrong
D. E. Notestine..........Lewistown, Mifflin
Sidney T. Isett.Spruce Creek, Huntingdon
G. I. Fugate........Ellsworth, Washington
R. S. Nicholson & Sons..Kittanning, Arm'g
W. M. Benninger.Benningers, Northampt'n

### CHESTER WHITES.

Peter B. Cowan.......Brookville, Jefferson
Herman Straub......Pittsburg, Allegheny
G. S. Barnhart.......Greensburg, Westm'd
R. L. Munce......Canonsburg, Washington
W. F. Gable............Wyebrook, Chester
F. W. Levis..........Chadd's Ford, Chester
Jos. T. Fleming...........Belleville, Mifflin
W. J. Monroe.Greensburg, Westmoreland
D. S. Kloss...................Tyrone, Blair
Sidney T. Isett.Spruce Creek, Huntingdon
F. W. & W. A. McCoy....Mercer, Mercer
D. W. Jones.............Wilmore, Cambria
H. D. Conley...................Etters, York
W. M. Benninger.Benningers, Northampt'n
J. F. Lantz & Co......Glenmoore, Chester
H. H. Snavely....Willow Street, Lancaster

### OZARK OR MULE FOOT HOGS.

A. M. Dickson & Son..Cochranton, Craw'd

### POLAND-CHINAS.

G. I. Fugate.......Ellsworth, Washington
W. J. Sturgeon....Kittanning, Armstrong
W. M. Thompson.....Uniontown, Fayette
D. Norman App........Selinsgrove, Snyder
C. A. Hershey..................Tillie, Adams
W. F. Wagner....Harrison City, Westm'd
J. L. Stouffer...Southwest, Westmoreland
Burns & Adams........Imperial, Allegheny
J. H. Peachey.............Belleville, Mifflin
R. S. Love....Mt. Pleasant, Westmoreland
H. H. Snavely..Willow Street, Lancaster
B. P. Steele............McVeytown, Mifflin
Benj. B. Baird...McClellandtown, Fayette

### ESSEX.

W. F. Throop..Espyville Station, Crawf'd

### CHESHIRES.

B. F. Gabler & Son....Greensboro, Greene

### TAMWORTHS.

R. S. Hartley..........Youngsville, Warren
Henry Palmer............Avondale, Chester
W. F. Throop..Espyville Station, Crawf'd

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## DOGS.

### SCOTCH COLLIES.

D. W. Jones............Wilmore, Cambria
M. P. Shoemaker & Bro.Greensburg, West.
R. S. Hartley..........Youngsville, Warren

### SCOTCH TERRIERS.

R. F. Shannon........Pittsburg, Allegheny

### AIREDALE TERRIERS.

R. F. Shannon........Pittsburg, Allegheny

### ANGORA CATS.

E. L. & Sidney Roberts..Malvern, Chester

### GUINEA PIGS.

W. F. Throop....Espyville Sta., Crawford

### CARRIER PIGEONS.

A. M. Dickson & Son..Cochranton, Craw'd

# END OF YEAR

Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1910

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1910

Master Negative Storage Number: MNS# PSt SNPaAg057.9

# 1910

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# Proceedings of the Twelfth Annual Meeting of the PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

JOINT MEETING
WITH THE
**Pennsylvania Dairy Union**

**Philadelphia, Pa., February 2, 3 and 4, 1910**

**H. E. VAN NORMAN, SECRETARY**

**Edited by A. A. BORLAND, Assistant**

# Proceedings and Papers

OF

# TWELFTH ANNUAL MEEETING

OF THE

# Pennsylvania Live Stock Breeders' Association

AND THE

# PENNSYLVANIA DAIRY UNION

HELD AT

**Philadelphia, February 2, 3 and 4, 1910**

OFFICERS OF BREEDERS' ASSOCIATION:

| | |
|---|---|
| President, | HON. W. C. NORTON, Waymart |
| First Vice-President | S. H. GILLILAND, Harrisburg |
| Second Vice-President | M. P. SHOEMAKER, Greensburg |
| Secretary | E. S. BAYARD, Pittsburg |
| Treasurer | J. F. LANTZ, Wyebrooke |

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# PREFACE

Several things beyond the control of the Secretary are responsible for the incompleteness of this Annual Report. The nature of the proceedings at Philadelphia made the taking of accurate stenographic notes almost impossible. Many of the lectures were held in the open, with animals for object lessons, in some cases a dozen or more animals. Others were held indoors but were of such a nature that correct reporting was quite difficult.

After the meeting, realizing the incompleteness of the stenographic reports, they were sent to those who had made the addresses. Those which came back are published herewith, but several of the speakers found it impossible to put the stenographer's notes in form that pleased them and declined to return them. These addresses, therefore, are omitted. Several lengthy discussions, notably those on horses, alfalfa and meadows and pastures, are omitted for this reason.

Up to within a few days of the meeting at Harrisburg, January 24-27, 1911, it was thought that the reports were too incomplete to justify the publication of this Bulletin, but at the last moment decided to do the best we could, so it was rushed into type. This prevented the compilation of our usual list of stock bred by members—the first time this has been omitted. I am sure that those who realize the difficulties of the situation will not censure any official for the incompleteness of this Report but will blame circumstances over which we had no control.

Acknowledgement should be made here of the many courtesies received at the College of Veterinary Medicine of the University of Pennsylvania. Everything that thoughtful minds and kind hearts could do, for this Association, its speakers and its guests was done. The entire staff of the College and the authorities of the University of Pennsylvania deserve the thanks of all who were concerned in the meeting and of the public as well.

Those who exhibited livestock did much to make the meeting a success and did it too at considerable trouble and some expense to themselves. They should be commended for their public spirit and their assistance to our Association in its educational work.

The work of our speakers was never more appreciated by the public than on this occasion. Long after the hour of closing they were surrounded by crowds who plied them with questions. To all these speakers we return thanks. We are deeply indebted to Pennsylvania State College for its hearty cooperation, shown by permitting so many of its Agricultural School staff to assist us in our work.

No one realizes more than the officers of the Pennsylvania Livestock Breeders' Association the many omissions and perhaps errors in this Report. But please remember the difficulties of the situation and the fact that all of us work for nothing and bear our own expenses, that we are busy men and cannot devote much time to these things. It is hoped that some provision may be made for the employment of a secretary to care for the work of this and other associations, for the sake of securing more complete and accurate reports for general circulation.

E. S. BAYARD, Secretary.

# DEMONSTRATIONS, CONTESTS AN LECTURES AT ANNUAL MEETINGS AT PHILADELPHIA

Probably 1,000 Pennsylvania livestock breeders, dairymen and farmers assembled at the College of Veterinary Medicine, University of Pennsylvania, Philadelphia, to witness the demonstrations and shows and to hear the talks given by experts at the annual meeting of the Pennsylvania Dairy Union and the Pennsylvania Live Stock Breeders' Association. The scope of the program was very broad. It included the annual Corn Show of the Pennsylvania Live Stock Breeders' Association, to which was added the show of apples made by the Pennsylvania Horticultural Society. The Breeders' Association had also arranged for exhibits of pure-bred livestock representing nearly all types of improved breeds, and also for horse demonstrations which included all types of horses now in use, while work horses competed for cups and ribbons. Animals fit for market were used for demonstrations on foot, and were later slaughtered and used for block demonstrations. The Dairy Union's program included demonstrations with dairy cattle and appliances, and exhibitions of milk and butter. With all the demonstrations, lectures and shows on hand at the same time, the meeting resembled a three-ring circus in some respects. The crowds were large both at the demonstrations and lectures, and the speakers were kept on the floor a long time answering questions. Almost everything was run on schedule time, however, and everybody seemed to be satisfied.

## IN MEMORY OF DR. PEARSON

At Houston Hall, University of Pennsylvania, on Wednesday evening, memorial exercises in honor of the late Dr. Leonard Pearson were held, under the auspices of the Pennsylvania Live Stock Breeders' Association, of which he was Vice-President. The principal speaker of the evening was Dr. James Law, the dean of the veterinary medical profession. Dr. Law not only paid a high tribute to Dr. Pearson, but went into some detail as to his connection with various problems of interest to stockmen. He declared that Dr. Pearson had marked out the way which all veterinarians should endeavor to follow. Vice-Provost Smith, Dr. Thos. F. Hunt, W. F. McSparran and several others offered brief tributes. Letters in relation to the great service Dr. Pearson had rendered to his state were received from Governor Stuart and Senator Penrose, and read to the audience.

## THE LIVESTOCK

Thursday afternoon J. B. McLaughlin, of Columbus, Ohio, discussed "Breeding Draft Horses," using some of his own magnificent specimens for examples. Mr. McLaughlin has faith in the future of the draft horse industry, but says that American farmers must pay more attention to the selection of their breeding animals and the development of their colts, in order to produce a large percentage of good horses. He made his escape after an hour or so of questioning.

Dr. Carl W. Gay, of the University of Pennsylvania, delivered one of the most instructive lectures of his career. He brought out a carriage pair and lectured on the type, how to produce them, etc. Followed that with a brougham horse, light harness horses, a gaited saddle horse, a walk, trot and canter horse, a hunter and a steeple chaser. Good specimens of all types were shown.

Nineteen entries came out for the show of heavy draft work horses, and over a score for the show of light draft work horses. It took the judge some time to make the awards in these classes, an excellent display of draft material being on hand, taken right out of the work teams of the city. Express or delivery horses shown to wagons made an imposing spectacle. Some magnificent delivery horses almost equal to carriage horses were shown in front of the finest type of delivery wagons. In order to show the type of horses required for fire use, the Philadelphia fire department sent out its heaviest truck and steamer, and made a few runs for the benefit of the crowd. Dr. Gay lectured on the class of horses required. Dr. Fitzpatrick, who arranged for this show, was warmly congratulated on the kind of horses he was using and the excellence of his turn-outs. Several horses in use in fire engines from 12 to 21 years were shown.

McLaughlin Bros., of Columbus, Ohio, sent over a car-load of horses which were used in demonstrations, and other breeders sent in stock, but the complete list has failed to reach us. Among them are:

Horses: J. S. Seal, Newtown Square; J. I. McAnany, Philadelphia; A. G. House, Philadelphia; William Kerr; J. Howard Supplee, Rosemont, harness and saddle horses. Jack: J. J. Haubert, Bala. Ponies: Senator James McNichol, Philadelphia.

Cattle: W. W. Blake Arkcoll, Paoli, Ayrshires; Cedarlin Stock Farms, Langhorne, Jerseys; J. W. Dulles, Westchester, Holsteins.

Sheep: J. F. Lantz & Co., Wyebrook, Shropshires; S. N. Hill, Markham, Southdowns; Penshurst Farm, Narbeth, Shropshires; Henry Palmer, Avondale, Dorsets and crossbreds.

Hogs: Soapstone Farm, Haverford, Duroc-Jerseys; Cedarlin Stock Farms, Chester Whites; Penshurst Farm, Berkshires.

Poultry: Soapstone Farm; Cedarlin Farm; Louis Schreiber, Philadelphia; W. J. Fretz, Philadelphia; W. W. Blake Arkcoll; J. S. Seal, Swarthmore; Dr. Carl W. Gay, Swarthmore.

Horses foar use in demonstration: Eli Kindig, Strawbridge & Clothier, Fox & Donnan—all of Philadelphia; also Philadelphia Fire and Police Departments.

All this was done at the expense of the individuals who owned the stock, and they deserve the wamest thanks for their public spirit. The local committee, consisting of Dr. C. J. Marshall, Dr. Carl W. Gay, Eli Kindig, Frank Clark, Henry N. Woolman, J. K. Shultz and A. B. Huey, was most efficient and left nothing undone to make the meeting a success.

## THE EXHIBITS

The Pennsylvania State College filled one room with a splendid show which attracted much attention. The Bureau of Feeding Stuffs of the Department of Agriculture at Harrisburg had an excellent exhibition of commercial feeding stuffs and of corn from all parts of the world. The State Live Stock Sanitary Board made large exhibit of veterinary specimens.

## THE APPLE SHOW

At the invitation of the Live Stock Breeders' Association the Pennsylvania Horticultural Association sent down its great apple show recently held at Tunkhannock. Messrs. Tyson, of Flora Dale, were in charge, and the interest in the exhibit never flagged. Beautiful specimens were shown, embracing all well-known Eastern varieties, and the Horticultural Association gained many friends through the geniality and ability of its representatives as well as by its exhibit. About 40 plates of apples were sold at auction and realized 50c to $1.50 per plate of five apples.

## ANNUAL BANQUET

The extempore banquet held at Boothby's brought out about 125, and it was a lively occasion under the direction of Prof. H. E. Van Norman, who acted as toastmaster. He had the nerve to call down every speaker who exceeded the five-minute limit, and the result was a score of pithy speeches covering a great variety of subjects in which breeders and dairymen are particularly interested.

## THE CORN SHOW

The corn show was smaller than that of last year and not generally of such good quality. Lack of moisture during the growing season showed in fewer entries and also in the corn. As usual the Yellow Dent class was the largest. It brought out a remarkable example of the value of pedigreed seed. For many years Mr. George G. Strosnider has bred his strain of Leaming corn, and it has won championship honors three times in succession at this show. This year seven growers showed this corn and took nine out of ten prizes offered. White corn took the ear championship, and it also came from Greene county. The southeastern class did not bring out such a show as was expected, the dry weather having prevented development of corn in that territory. The Corn Growers' Contest, which over thirty farmers entered last spring, brought out only four entries, the others having become discouraged by drouth. First prize, on the basis of the points given below, went to Robert A. Lowry, of Crawford county, who produced 5,406 pounds of ears on his acre. All the yields were light. Mr. Lowry's sample was not a good one, being excelled by all the rest in both size and quality, but his larger yield won the prize.

### Corn Awards

YELLOW DENT.

| | | |
|---|---|---|
| 1 | George W. Eisiminger | Waynesburg |
| 2 | Burton Bayard | Waynesburg |
| 3 | Jesse L. Eisiminger | Waynesburg |
| 4 | Burton Bayard | Waynesburg |
| 5 | W. W. Ordoff | Waynesburg |
| 6 | George W. Gordon | Waynesburg |
| 7 | George G. Strosnider | Waynesburg |
| 8 | George W. Gordon | Waynesburg |
| 9 | G. Martin Cloud | Kennett Square |
| 10 | B. F. Gabler & Son | Greensboro |

WHITE DENT.

| | | |
|---|---|---|
| 1 | C. P. Orndoff | Waynesburg |
| 2 | Penhurst Farm | Narbeth |
| 3 | C. P. Orndoff | Waynesburg |
| 4 | Geo. W. & C. A. Row | Yardley |
| 5 | L. W. Kintigh | Irwin |
| 6 | Lee L. Trimmer | Mechanicsburg |
| 7 | Alice S. Merchant | Penllyn |
| 8 | J. J. Hartman | Darby |
| 9 | B. B. Brubaker | New Holland |

NINETY DAY TYPE.

| | | |
|---|---|---|
| 1 | G. Martin Cloud | Kennett Square |
| 2 | Post Brothers | West Alexander |
| 3 | John W. Trimmer | Mechanicsburg |
| 4 | I. N. Rhea | Freesport |
| 5 | I. N. Rhea | Mechanicsburg |
| 6 | G. A. Trimmer | Mechanicsburg |
| 7 | G. A. Trimmer | Mechanicsburg |
| 8 | W. F. Vallerchamp | New Berlin |
| 9 | S. F. Eiker | Waynesboro |
| 10 | B. F. Gabler & Son | Greensboro |

WHITE-CAPPED YELLOW DENT.

| | | |
|---|---|---|
| 1 | A. T. Holman | Millerstown |
| 2 | Harry B. Herr | Lancaster |
| 3 | Allen S. Merchant | Penllyn |
| 4 | Allen S. Merchant | Penllyn |
| 5 | Alfred S. Schuyler | Turbotville |
| 6 | Joseph S. McCann | Fredonia |
| 7 | James W. More | Bethlehem |
| 8 | J. B. Funk | Clayton |
| 9 | S. E. Musselman | Allen |

FLINT CORN.

| | | |
|---|---|---|
| 1 | James W. More | Bethlehem |
| 2 | J. D. McKnight | Bakerstown |
| 3 | J. H. Ferris | Little Marsh |
| 4 | T. G. Jones & Sons | Sugar Grove |
| 5 | Harry Rockwell | Canton |

SOUTHEASTERN TYPE.

F. W. Levis.................Chadd's Ford

This class judged by Thomas Sharpless, West Chester, Pa.

SOUTHEASTERN TYPE (Continued)

| | | |
|---|---|---|
| 1 | Harry B. Herr | Lancaster |
| 2 | George W. & C. A. Row | Yardley |
| 3 | J. G. and J. A. McSparran | Furniss |
| 4 | Jacob J. Haubert | Bala |
| 5 | E. W. Walton | Christiana |
| 6 | Jacob F. Betz | New Hope |
| 7 | B. B. Brubaker | New Holland |
| 8 | M. L. Greider | Mt. Joy |
| 9 | S. F. Eiker | Waynesboro |
| 10 | W. L. Rhoads | Lansdowne |

Grand Champion Ear, an ear of Boone County White, raised by C. P. Orndoff, Waynesburg.

Grand Champion Exhibit of 10 ears, Yellow Leaming, George W. Eisiminger, Waynesburg.

### Corn Growers' Contest

Yield to count 70 points, economy of production 20 points, sample of corn 5 points and report 5 points.

1 Robert A. Lowry..............Shadeland
2 Lewis P. Satterthwaite.....Fallsington
3 C. W. Mohler................Myerstown
4 G. A. Trimmer...........Mechanicsburg

### FIRST PRIZE.

Robert A. Lowry, Shadeland, Crawford County.

Preparation of Acre.

1 Date of plowing—May 15th, 1909.
2 Depth of plowing—Six inches.
3 Kind and amount of fertilizer or manure used—stable manure, about 6 loads.
4 Date of application of fertilizer—May 12th, '09.
5 Preparation of soil besides plowing—Harrowed three times and floated.
6 Distance between rows—Three and one-half feet.
7 Distance between hills—Three and one-half feet.

Corn.

1 Variety planted—Huron Dent.
2 Date of planting—May 20th.
3 Dates of cultivation—June 2d and 14th, July 1st, 2nd, 13th and 22nd.
4 Implements used—Shovel-plow and cultivator combined.
5 Date of maturity—ready to cut—About October 1st.
6 Date of husking—November 3rd, 4th and 5th.
7 Pounds of ears per acre—5406 pounds.
8 Number of stalks on acre and per cent. of barren stalks—15,346 stalks, .09 per cent. barren.

Remarks—A part of the so-called barren stalks were stalks that ears were broken off by cattle and eaten—probably 25 per cent.

The Soil.

1 Character of soil—Gravely-loom slightly descending to the West.
2 Elevation above sea-level—About 1000 feet.
3 Crops grown in previous three years—Corn.
4 Kind and amoutn of fertilizers and manurse used on the three previous crops—Stable manurse about six loads to the acre.

Comments—I am now sending you my report of my acre of corn. I have had a number of difficulties to overcome in raising this corn. We have had a very dry season here. A large flock of ducks that lived on it this fall, destroyed all that was on the ground. Also a drove of cattle broke in and destroyed a great deal. Probably about 25 per cent. of the barren stalks were caused in this way, but I am satisfied that I have a good yield.

### SECOND PRIZE.

Lewis P. Satterthwaite, Fallsington, Bucks County.

Preparation of Acre.

1 Date of plowing—May 3rd.
2 Depth of plowing—Five inches
3 Kind and amount of fertilizer or manure—400 lbs. composted hill with chicken manure, Tremull's Royal Fish Fert. 2—7—3.
4 Date of application of fertilizer—May 11th Fert; May 13th compost.
5 Preparation of soil besides plowing—2 directions with cutaway harrow and twice with smoothing harrow.
6 Distance between rows—3 ft. 8 inches.
7 Distance between hills—3 ft. 8 inches.

The Corn.

1 Variety planted—Improved Leaming.
2 Date of planting—May 13th.
3 Dates of cultivation—June 8, 15, 21, 25; July 1, 6, hoed July 25.
4 Implements used—Iron-Age 2-horse cultivator.
5 Date of maturity—ready to cut—Oct. 11th.
6 Date of husking—Nov. 12th.
7 Pounds of ears per acre—4700 lbs. good corn, and 400 lbs. nubbins, and poor corn.
8 Number of stalks on acre and per cent. of barren stalks—8282 stalks, 11 per cent. barren.

Remarks—Many hills were missing owing to corn being pulled by birds. It was tarred but it didn't seem to make any difference. It was replanted also where missed. There was a lack of moisture this summer.

The Soil.

1 Character of soil—Clay loam.
2 Elevation above sea-level—About 100 feet.
3 Crops grown in previous three years—Hay.
4 Kind and amount of fertilizers and mause used on the three previous crops—Top-dressed with horse manure.

Sorry the report was not in sooner but was detained on account of getting the stover in to ascertain the cost of production. I enclose the report. I have figured that it has cost me between $20 and $25 to raise the corn for manual labor and fertilizer. This does not include the team.

### THIRD PRIZE.

C. W. Mohler, Myerstown, R. 2, Lebanon County.

Preparation of Acre.

1 Date of plowing—May 8, '09.
2 Depth of plowing—6 to 7 inches.
3 Kind and amount of manure used—Stable from horses and cattle.
4 Date of application of manure—Week of March 14th.
5 Preparation of soil besides plowing—Harrowed and rolled.
6 Distance between rows—3 feet, 8 inches.
7 Distance between hills—1 foot, 2 inches.

Remark—Soil in good condition for planting.

The Corn.

1 Variety planted — Common Indian Corn.
2 Date of planting—May 13, '09.
3 Dates of cultivation—June 3, 10, 17.
4 Implements used—A 5-shoveled cultivator and a scraper.
5 Date of Maturity—ready to cut, week of October 4.
6 Date of husking—Oct. 28th and 29th.
7 Pounds of ears per acre—4800 lbs., half crop for this dry season.
8 Number of stalks on acre and per cent. of barren stalks—10,081 stalks, about 34 per cent. barren.

The Soil.

1 Character of soil—Lime stone, generally mealy.
2 Elevation above sea-level—About 475 feet.
3 Crops grown in previous three years—1906 wheat, 1907 wheat, 1908 grass.
4 Kind and amount of fertilizers and manure used on the three previous crops—1906 pure bone and potash, 200 lbs. per acre; 1907 same fertilizer, and stable manure.

### FOURTH PRIZE.

G. A. Trimmer, Mechanicsburg, Cumberland County.

Preparation of Acre.

1 Date of plowing—April 14th and 15th.
2 Depth of plowing—Seven inches.
3 Kind and amount of fertilizer or manure used—Stable manure and 150 lbs. fertilizer.
4 Date of application of fertilizer—In row at planting.
5 Preparation of soil besides plowing—2 rollings and 3 harrowings.
6 Distance between rows—42 inches.
7 Distance between hills—1 kernel every 15 inches.

Remarks—Had about 80 per cent. of a stand.

The Corn.

1 Variety planted—Snow-White Dent.
2 Date of planting—May 12th.
3 Dates of cultivation—Harrowed twice in May with smoothing harrow.
4 Implements used—Cultivated twice a week till August with 1-horse cultivator.
5 Date of maturity—ready to cut—About first week in September.
6 Date of husking—November 6th.
7 Pounding of ears per acre—2425.
8 Number of stalks on acre and per cent. of barren stalks—30 per cent. barren this year.

Remarks—Crop cut down more than one-half by great drought.

The Soil.

1 Character of soil—Chestnut loam on slate ridge.
2 Elevation above sea-level—About 450 ft.
3 Crops grown in previous three years—Oats, wheat and grass.
4 Kind and amount of fertilizers and manure used on the three previous crops—About 166 lbs. fertilizer to oats and to the wheat. Stable manure on this plat was applied during last winter. A light dressing.

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# Proceedings of the Annual Meeting of the PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

Philadelphia, Pa.,
February 2, 1910, 10 A. M.

President Norton in the Chair.

The President—Gentlemen, we will now come to order. I have the pleasure of introducing to you Prof. W. A. Cochel, of State College, who will give us a demonstration of beef cattle.

Prof. Cochel spoke as follows:

## Address of Prof. Cochel.

We have met here this morning to have a demonstration in beef cattle. As we all know, the question of beef is of very vital importance at the present time, and in order that we may be better prepared to discuss market demands, we have brought in an animal with which to study and bring out the points of a good beef animal. For this purpose we have secured an ordinary market steer—one that would probably classify as a good beef steer on the market.

The cattle feeder, who feeds for the market, wants a steer that he can feed for three or four months, and then have him ready for the market. In selecting his cattle, he should pay a great deal of attention to the head. He wants a short broad, head, broad between the eyes, with a short, full neck—a blocky, low-down animal, with a deep body, indicating good digestive organs—one that will mature quickly. In selecting feeders, it is important to select one of quiet disposition, so that he will not waste his energy in restlessness, but apply it to the digestion of his food. However, when it comes to the butchers', the head is of very little importance. He gets very little for it, and it is not important with him to pay much attention to the head of the animal.

The neck comes next, and the shorter and thicker it is, the better. The meat that comes from the neck is very cheap beef. That is where we get our chuck steaks and boiling pieces, and it sells at a lower price than other parts of the animal. We want the neck thick because we want thick muscle, which indicates a thick covering over the entire body. Then, we want the shoulder and neck to blend. In a well rounded animal, you can really not tell where the neck ends and the shoulder begins. Then we want him well covered all over his shoulders. This animal is not very well covered over his shoulders. He is not well finished.

The President—Just a moment, please. We have with us Dr. Smith, Provost of the University of Pennsylvania, who will address us, and whom I have now the pleasure of introducing to you.

Dr. Smith addressed the Association as follows:

Mr. President, and Members of the Pennsylvania Live Stock Breeders' Association—On behalf of the Provost and Trustees of the University of Pennsylvania, I want to extend to you a most cordial welcome to this school of our University—the Department of Veterinary Medicine. I can assure you that we appreciate your coming here very deeply. We know the splendid work that is being done by you. We know and appreciate your efforts in behalf of Veterinary Medicine, which is a part of the great study of medicine.

I have been brought up in the country, and I know something of the conditions on the farm, and I have a love for animals. The importance of the whole subject of animal industry to this country is becoming greater every day, and I am grateful to the men who are making veterinary medicine what it is today, and who are elevating it and lifting it to a high plane. The University of Pennsylvania has always recognized things of this kind. If you will look back into its history, you will find that more than a century ago, the subjects pertaining to agriculture were discussed and taught, and so, although we have no School of Agriculture connected with it, we feel that the University of Pennsylvania is very closely allied with the farm, and the erection of this magnificent building, which is an honor to the state, is largely due to your co-operation.

In behalf of the University, and of those who are engaged in teaching in it, I bid you a cordial welcome.

The President—The response to this Address of Welcome will be delivered by Mr. E. S. Bayard, of Pittsburg.

Mr. Bayard spoke as follows:

It gives us great pleasure to come here, and we want to express our appreciation of what has been done for us by the University of Pennsylvania, and especially by the members of its Veterinary School. Everything has been made very pleasant for us all by your staff. With regard to Dr. Smith's reference to the relations between agriculture and veterinary medicine, while they have not always been harmonious in the past, we feel that we are getting closer together. Our farm animals have increased in value, and our animal industry is becoming one of the greatest sources of value in the country. In view of this, the health of our animals is becoming more important all the time, and therefore we are in better position to appreciate what you are doing here.

We thank you for what you have already done, for what you still expect to do for us, for all we know you are going to do, and, especially, for your cordial welcome.

The President—Prof. Cochel will now resume his lecture.

PROF. COCHEL—(Continued.)

We started in with the head and neck of the animal, and I want to call attention right here to one difference between the dairy and beef type. The beef cow has a short, thick neck, and the dairy cow has a long slim neck. The animal with a long slim neck is more inclined to pay special attention to the production of milk than the one with the short, thick neck. When standing behind the finished beef animal, the ribs should be so well sprung as to make the back almost level. In other words, we want to be able to draw a straight line from the shoulder to the rump, having it touch all along. In the dairy cow, we want a wedged shape—slim and somewhat narrow at the neck. increasing in width towards the rump. In the beef animal we want a straight back, because it usually indicates heaviness and thickness of the muscle.

The highest priced cut in the forequarter is the rib, where we get the prime cuts of rib, and a little farther back is where we get the sirloin and porterhouse steak. It is important that we develop just as much as possible of rib, loin and rump, for along here the high priced cuts are located. If we run a line from the point of the shoulder parallel with the ground across the body, we find that the high priced meat is above that line, while the low priced cuts, like the brisket, are under it. In selecting a beef animal we want to get just as much of him above the median line and just as little below as possible. He should be deep in his forequarters, as there lies his heart and his lungs and his vital organs, and he needs all these well developed to enable him to breathe well and to digest his food thoroughly. Then we want him to be well developed in depth of hind flank, so as to give him capacity. In a beef animal, we want an animal that will develop easily and mature quickly. In order to do this, he must be able to consume and digest a large amount of food.

When we look at him from the side, we want him to be built close to the ground. Too many are up standing and shallow, hence are not able to consume a large amount of food, consequently it does not pay to produce them. An animal that is built close to the ground will finish up easier, and mature quicker on the same amount of food. If you take these upstanding animals, you will find that they require two, three or four years to finish. As land advances, the question of producing beef animals in this section becomes an important one, and the point of early maturity is one that we cannot afford to overlook. It means dollars to the men who produce beef cattle. Then we go back here a little further, and we want the hips to be smooth. We buy feeders for possibly four and a half or five cents a pound and it costs from ten to twelve cents for each pound of gain. We find that the less prominence here in the hips and in the shoulders, the quicker he will finish. Then, we want him to carry his width straight out to the rump, so as to get a larger amount of the high-priced meat. In other words, we want a beef animal to carry his width from one end to the other. Then, there is another point in the beef animal that we must consider, that is his hind flank. We want a deep hind flank, so as to get a heavier proportion of the round, which is one of the valuable cuts of beef.

I have said nothing yet as to quality, which, aside from form, is next most important. We want quality—good handling quality—a skin that is a mellow, a loose hide. We find that the stomach and internal organs are simply a continuation of the outer skin, and if we have a good, mellow hide on the animal, digestion is good. Then there is quality of bone. We want a fine-boned animal for a meat steer, with a good covering of muscle and fat. When we find a big-boned animal, we find at the same time a big, heavy animal, that will take a long time to finish. It is possible, however, to carry selec-

tion for fine bone to excess. You want an animal whose bones are in proportion to his size, as fine bone as you can get in proportion to large development of body. The development of bone should be sufficient to hold up the body. Anything more than that is superfluous. Then comes the quality of his flesh. That should be fine grained and finely marbled. We find that meat from an animal of quality is always of finer texture than the meat from the coarse, heavy animal.

After we have selected our animal of the type and quality most desirable for the production of beef, we will find that he will consume a larger amount of rough food than the dairy cow, and of concentrated feed, also. The first thing to feed for, is for maintenance. Suppose that a thousand-pound steer eats approximately twenty pounds a day; fifteen of this goes for maintenance, and the other five into the making of beef. On the other hand, if the animal has the ability to consume twenty-five pounds, he will be just so much quicker finishing, using fifteen for maintenance and ten for production. Therefore, in selecting our animals, it is advisable that we procure them with large feeding capacity. Now, that is not so necessary when it comes to marketing. An animal that is well developed in the paunch is not so desirable, because there is too much waste.

In the feeding of this steer, and in the selection of a fat steer, there are three places in which you can judge whether or not he is fat. When the steer is finished, the outward evidences are a fullness in the throat, due to a deposit of fat at the base of the tongue, a thickness in the hind flank and a fullness in the cod due to a deposit of fat in those regions. This animal is pretty well filled out for a market animal, but the round is deficient in depth and width. As the feeding continues, his loins become thicker, and the width across the rump increased. You have noticed that when you first put a steer to pasture that his four legs seem to follow the same path, but as he fattens you will notice a difference, as a thoroughly finished steer makes two paths. His fore legs and his hind legs are far enough apart to do that. Another advantage in an animal of this kind, as compared with the dairy-bred steer, is the thickness of meat of the valuable cuts. As he becomes thoroughly ripened and fattened, this fat is distributed through the muscles, increasing their bulk. A fat steer will sell in the Chicago market for eight to nine cents; one that is not fat but in "feeder" condition will bring four to five cents. A steer like this will bring about six cents. As an animal develops a greater proportion of the higher priced cuts of meat, it becomes more valuable.

In fattening steers for market, a man must be guided largely by what he produces on his farm. The man who raises a large amount of corn and roughage has two outlets for his products. Either he can market them in the original form, or he can feed beef cattle, obtaining a market value for his crops, at the same time returning the fertility to the soil in the shape of the manure, thus making a double profit on his land. By adopting the first method, a man is much more likely to take the fertility out of the soil, as has been done in so many sections. No better method of restoring this fertility can be found than by feeding roughage crops to our cattle, and in that way get more out of the soil and out of the market than by selling the crops in their original form. The question of feeding is one that we could talk on for a couple of hours, but it is one that each man must consider for himself. We must make the most of our grass and of our pasture in feeding cattle in Pennsylvania, for which this state is well adapted. It used to be that it paid best to go West and ship the cattle from there, but as our land decreases in fertility and cattle values increased, it becomes more profitable for us to raise our own cattle. From a Pennsylvania standpoint, we want to select and handle cattle that will grow fat on grass, and with our grass crops, and our forage crops to feed, will take but little corn to fatten. That is only possible from the use of the well bred animals, which mature quicker and on less food than the scrub animal.

The question of winter feeding must also be considered. If a man has a large amount of corn, and a small amount of pasture, he can afford to produce the so-called "baby beef", but if he has a small amount of corn, and a large amount of pasture, it will pay him better to take a year or two for growth before finishing for the market, and to use nitrogenous supplements in connection with farm crops, where he does not have alfalfa. One of the best feeds for beef cattle is corn silage. The work at the Indiana Experiment Station the past four years shows that the cattle fed on silage mature much quicker and easier than those fed on anything else, and command a better price. Silage will be one of our best feeds for fattening beef cattle in Pennsylvania, as well as one of the most valuable feeds for the dairy cow.

Of course, type will have some influence on the profitable finish for market. If you have a coarse, rough animal, that nothing will ever develop into a first-class animal, you had better market him as a butcher steer. If you have a high grade beef animal it will pay better to feed two or three months longer. As we increase the quality and improve the type of our animals, we can better afford to make them fat and produce a high quality of meat than to handle the ordinary grades of cattle.

I have said nothing about dairy cattle, because we will have a dairy cattle demonstration here, and I will leave that for the dairy man; but I will say that the dairy cow stands in a class by herself as a producer of human food, and for economical consumption of forage. There are conditions, however, where it is unprofitable to produce a dairy cow. The dairy cow is broader across the hips and hind portion, and is wedged-shaped, while the beef animal carries its width straight through. In looking at the beef steer from all sides, the more nearly he approaches straight lines, the more nearly he approaches the highest type of beef animal. That is the difference between the two types of animals. The main reason that we want this thickness in the beef animal is that it gives us the thickness of meat.

These two animals are in nearly the same condition, and you will notice the difference between them. We want beef cattle to have a heavy flank; this is one of the indications of the good beef animal. Now, this animal is not an extreme beef type; it has not been fed long enough to bring out the points of a good beef steer. He has good quality and a good covering of flesh, but no great amount of fat. He has a decided droop in his back, which detracts from his value as a beef animal. The back of a beef animal should be perfectly straight. It indicates a thickness of muscle. Then, he is very deficient in the round. That might be developed, but not brought up to an ideal condition. From the butchers' standpoint, he will not dress out well enough in the choice sections. He has entirely too much weight in front for a steer of beef type; the high priced cuts are in the back. He has, however, a good coat of hair, and a good skin on him. Of course, he has not fat enough to show to the best advantage, but on the whole he is a good steer, not very well finished.

I think I have taken about all the time allotted to me. Are there any questions?

Mr. Bayard—Tell us what he is billed at.

Prof. Cochel—This steer weighed 960 pounds at Pittsburg day before yesterday. He sold for six cents a pound. He is not in the best condition, due to his shipment from Pittsburg, and spending several days in the car.

A Member—You say he is not very well finished; if he had been fed better, so as to weigh say, seventy-five pounds more, would that put him in a better condition?

Prof. Cochel—Seventy-five pounds would not finish him. In order to sell as prime, he would have to have three hundred pounds more.

Mr. Bayard—It wouldn't pay to put it on, though. He is in about the right condition for the Pennsylvania butcher market.

A Member—How much would three hundred pounds make to the butcher when he comes to sell him?

Prof. Cochel — About two hundred pounds.

A Member—Would it not be nearly all fat?

Prof. Cochel—Yes, it would be largely fat, some of which would be distributed in the lean.

A Member—Would not the butcher have to trim off the fat, so it would not be very profitable?

Prof. Cochel—That is a question of putting on fat; if the fat were distributed within the lean, it would add to the quality, and make the meat more tender. Then, of course, there would be some waste. It would add more to his internal organs. If he should add three hundred pounds more it would increase the outside layer of fat, to some extent, which, in a local market, would not be so desirable, but in a fancy steer the outside layer of fat is required because it adds to the flavor of the meat to cook it in its own fat. The whole question of finishing cattle is this: when you are finishing a two-year-old steer, you should increase his value per hundred every day; at the present price of feed, the very best possible system of feeding a steer would require a monthly increase of thirty-five to forty cents per hundred in selling value in order to insure a profit.

A Member—How does the Holstein rank as a beef animal?

Prof. Cochel—They are dairy cattle, and among the very best dairy cattle, but if developed for beef, they lose some of their very best qualities. They are not beef cattle.

A Member—But they are generally marketed for beef.

Prof. Cochel—Of course, they always sell for cheap beef, but they do not develop the very best meat. When you attempt to produce beef from a dairy animal, you make a mistake. The time to make beef out of them is as veal. The Holstein calf has as much value as veal as the Angus or the Shorthorn.

A Member—What kind of a steer would be best for the farmer to buy?

Prof. Cochel—It depends very much upon what the farmer has to feed him. If he has a large amount of roughage and a small amount of corn, the thinner he gets them in proportion to the price he pays, the more profitable. If he has a large amount of corn, he wants to buy them as fleshy as possible.

A Member—You spoke of producing "baby beef". What breed would you recommend the Pennsylvania farmer to use?

Prof. Cochel—The Hereford, the Angus, or the Shorthorn are the best. In the production of "baby beef", the calf wants to have the milk of the cow, and learn to eat corn while suckling. If it is weaned at six months of age it will take from eight to twelve months of heavy feeding to make prime baby beef.

A Member—How is the marbling of meat produced?

Prof. Cochel—It is part of the breeding of the animal. In the first place, you want an animal of the beef breeds, so that it will distribute the fat among the lean, and in the second place, it comes from feeding. If fed strictly on corn and timothy hay, the animal will not develop as much marbling or as quickly as if fed on the more nitrogenous feeds, like alfalfa hay or bran—but bran is too expensive to feed beef.

A Member—Do you not get better results from the feed given a calf or a one-year-old, than from an animal three or four years old?

Prof. Cochel—Undoubtedly we do, but they do not increase quite as rapidly in value per hundred while we are feeding them. When we are feeding the younger animals we must feed a larger proportion of corn and less roughage than with the mature animal, but if you look at it from the point of the amount of digestible food required to produce a pound of beef, the younger the animal, the better. In the work I have been doing the past four years, we have been buying calves, yearlings and two-year-olds and feeding them for market for experimental purposes. We find that our two-year-olds will be ready for market after five or six months of full feeding. Our yearlings require a month or six weeks longer, while the calves require about three months longer to get the same degree of finish.

A Member—What would be the rate of progress?

Prof. Cochel—The two-year-olds may be more expensive to begin with, but they

make a more rapid gain, so it makes them less expensive in the end.

A Member—How long would it be possible to have the calves run around with the herd of cows, and still insure a calf every year?

Prof. Cochel—I was brought up in Missouri, where we are in the habit of letting our calves run with the cows all the time. We usually wean our calves at six months, and expect to get a calf every year. We allow them to run in the blue grass pasture in the summer. If they drop their calves about pasture time, we usually turn them into the field and then carry the cows over winter on roughage. We give all the advantage to the calves, and by weaning time expect them to weigh 500 pounds.

A Member—Do you let the cow go dry during the winter?

Prof. Cochel—Yes.

The President—Gentlemen, we have another demonstration on for this morning, so I guess we will have to close this one. The next one will be a demonstration on Swine, by Prof. Minkler of the New Jersey Agricultural College, which will be held outside.

## Afternoon Session

## MEADOWS AND PASTURES

### Dr. Hunt, State, College

Tuesday, February 2, 1910,
2 O'Clock, P. M.

The afternoon session was held in Houston Hall, University of Pennsylvania.

President Norton in the Chair.

The President—The meeting will please come to order. I have the pleasure of introducing to you Dr. Hunt, Dean of the School of Agriculture at Pennsylvania State College, who will talk to us on "Meadows and Pastures."

Dr. Hunt spoke as follows:

The Flemish had a proverb: No grass, no cattle; no cattle, no manure; no manure, no crops.

What these lowland farmers of Europe meant was that good grass is the basis of good agriculture. We are not without illustrations in this country, as, for example, the famous blue grass region of Kentucky. Every practical farmer knows that if he has a good, heavy sod to plow up he may reasonably expect, other things being equal, to secure a good crop of corn, while if his meadow is allowed to run out the chance of a successful crop is very much lessened.

It has been the custom to apply yard manure to land for corn and to use commercial fertilizers for wheat, but the value of the fertilizers, particularly commercial fertilizers, in increasing the growth of grass and thereby building up the fertility of the soil has not been generally understood. It is true that some farmers do top dress their meadows with yard manure and this is a good practice but very few have applied commercial fertilizers to their grass lands. After some years of investigation of this subject I believe it safe to assert that the same money used in applying commercial fertilizers to grass lands will bring a greater profit than when applied for corn or wheat. Of more importance, however,is the fact that while obtaining this greater profit the land is made more productive for succeeding crops. This does not mean that fertilizers may not be used to advantage for either corn or wheat, but merely that a still greater profit results when applied to grass lands.

This paper has only one purpose. It is to demonstrate so clearly and forcibly that the above statements are true that land owners will be induced to act upon them.

In the address on "Soil Fertility" delivered before the last meeting of the Pennsylvania State Board of Agriculture, the speaker touched briefly upon the importance of clover in keeping up the fertility of the soil. It is desired to develop a little more in detail the lesson of these fertilizer experiments at the Pennsylvania Station with reference to the influence of common red clover. Those who listened to the address of last year or who have read the bulletins of the Pennsylvania Station know that these fertilizer experiments which have been in progress twenty-eight years consist of four tiers, each containing thirty-six eighth acre plats. The four tiers represent a complete four-year rotation of corn, oats, wheat and hay (clover and timothy). The fertilizers are applied to the corn and wheat only, thus being applied on alternate years or twice in the rotation.

It so happens that there are five plats on each tier receiving no fertilizers of any sort while there are four which have received only mineral fertilizers, consisting of 48 pounds of phosphoric acid equivalent to 320 pounds of 15 per cent. dissolved bone black or dissolved rock phosphate and 100 pounds of potash equivalent to 200 pounds of muriate of potash, 80 per cent. purity. The following table shows the average yield of the seven products of the rotation during the last five years of the first twenty-five years, where there was no fertilizer and where mineral fertilizers were applied. These years have been chosen because the conditions probably more nearly represent the comparative results to be obtained on run down limestone soil.

Average 5 Years, 1902-6.

| | No treatment<br>5 plats | Phosphoric Acid 48<br>Potash 100<br>4 plats |
|---|---|---|
| Corn, ears, bu....... | 35.6 | 51.4 |
| Corn, stover, lb...... | 1711 | 2685 |
| Oats, grain, bu...... | 23.4 | 34.4 |
| Oats, straw, lb...... | 1110 | 1693 |
| Wheat, grain, bu... | 10.5 | 19.9 |
| Wheat, straw, lb.... | 816 | 1627 |
| Hay, lb. ............ | 2329 | 4469 |

During the last five years, 1902-1906, in place of 36 bushels of corn where no fertilizer was applied 51 bushels were grown where mineral fertilizers only were used. There were 34 bushels of oats in place of 23 bushels, 20 bushels of wheat in place of 10½, and nearly 2¼ tons of hay in place of a little more than a ton. This was done at an annual cost of $3.20 per year, but if we are correct in believing that the application of potash was excessive and could be reduced one-half, then the result would be obtained at an annual cost for fertilizer of $2.20.

This photograph shows the hay raised this year (1909) on plats 13, 14 and 15 of Tier 3. Below is shown the treatment as follows:

| | Treatment | Yield |
|---|---|---|
| Plat 13............ | Plaster, 320 lb. | 1408 |
| Plat 14............ | No treatment | 1216 |
| Plat 15............ | P 48, K 100 | 4496 |

Plat 14 has received no fertilizer in twenty-eight years, while plat 15 has received the mineral fertilizers every other year. The first plat yielded at the rate of a little over half a ton of hay, while the latter produced at the rate of nearly 2¼ tons. It will also be observed that but little result was obtained from the application of 320 pounds of land plaster. The principal reason for introducing this photograph, however, is merely to impress my hearers with the fact that these were actual results obtained from real land.

The purpose of calling attention sharply to the results obtained from the use of these mineral fertilizers, phosphoric acid and potash, is not for the purpose of pointing out their value in keeping up the fertility of the soil so much as it is to call attention to the vast importance of clover and other leguminous crops in supplying the nitrogen. Nitrogen is absolutely necessary to growing crops. It usually is the first element to be exhausted from the soil. It is the most expensive element to replace, costing about 20 cents a pound as compared to five cents for phosphoric acid and four cents for potash.

The three principal methods of keeping up the nitrogen supply of the soil open to the average farmer are, (1) by raising clover or other leguminous crops, (2) by carefully saving through the use of proper bedding the liquid excrement by animals, since it is the liquid excrement that contains most of the nitrogen, and (3) by buying nitrogen in commercial fertilizers at twenty cents a pound for the nitrogen contained. All three ways are good in their place. It is safe to say, however, that the farmer who raises staple farm crops and does not have a systematic rotation in which clover or some other leguminous crop enters is slowly going into bankruptcy.

But, it may be said, I cannot raise clover any more. It must be admitted that there is a vast area, more than ten million acres in New York, Pennsylvania and Ohio, known as the Volusia series of soils on which in recent years great difficulty has been found in raising red clover. The distribution of this series of soils is shown roughly on this map. It so happens that the speaker lived for some years on the edge of this area and studied the soil conditions with considerable care. Some experiments were planned and carried out by Cornell Station in order to determine, if possible, why clover failed so completely on certain of these soil types, epsecially that type known as the Volusia silt loam.

A careful study of all the probable factors influencing the growth of red clover was made. Among other things experiments were made to determine the influence of lime, yard manure and commercial fertilizer in producing red clover. One of these trials was conducted on a loam soil at Cherry Creek, Chatauqua County, New York, described as a once fertile farm that had become so poor that the former owner had lost it. The following table shows the method of treatment and the results obtained during 1908. The mammoth clover was sown in oats the previous year. To avoid misunderstanding it should be stated that other results, not given here, indicated that common red clover was to be preferred to mammoth clover.

Yield of Mammath Clover in 1908 at Cherry Creek, Chatauqua County, N. Y.

| No. plats | Treatment | Unlimed | Limed |
|---|---|---|---|
| 5 | Nothing | 1824 | 3852 |
| 1 | P, K | 2349 | 4174 |
| 1 | P, K, N | 2235 | 4085 |
| 1 | 15 tons manure | 2091 | 4976 |

P—Acid phosphate, 100 lbs.
K—Muriate of Potash, 50 lbs.
N—Nitrate of Soda, 100 lbs.

Here the most important result was obtained by liming and here the best results were obtained by both manure and lime. Where there was a combination of manure and lime 2½ tons of hay were obtained in place of a ton without treatment. Not only was the yield of hay increased but the character was changed. Although only mammoth clover was sown, on the unlimed plats the principal grass growing with the clover was red top, while on the limed plats the redtop was replaced in part by timothy which made a strong growth.

In another experiment made in Tompkins County where the soil type, Volusia silt loam, was much less productive yard manure gave much less favorable results. The unlimed and unfertilized area yielded 1015 pounds of hay; the limed area which received mineral fertilizers yielded 1929 pounds of hay; while the limed area which receives yard manure yielded only 1555 pounds of hay. In other words, the stable manure caused an apparent decrease in yield. This second experiment, however, in no way detracts from the lesson to be derived from the Chatauqua County experiment. It merely shows that other conditions exist to prevent the manure becoming effective. In this particular instance it was probably due to the manure emphasizing the effect of the severe drouth.

Any land, which when sown to clover and timothy, produces in their stead chiefly redtop and sorrel (Rumex acetosella), will be benefited by the use of lime. Apply anywhere from 1000 to 4000 pounds or from 15 to 50 bushels. In the opinion of the speaker it does not matter greatly how much is applied, when it is applied, or what kind is applied. The chief thing is to get finely divided lime into the soil. Ordinarily it may be applied on top of plowed land when it is being prepared for corn. One may buy recently burned quick lime and allow it to slake in piles, or buy slaked or hydrated lime or ground or pulverized limestone provided it is ground finely enough. It should be remembered, however, that it takes about 1350 pounds of hydrated lime and about 1800 pounds of pulverized limestone to furnish as much actual lime as 1000 pounds of pure quick lime.

There is one lesson, however, that every land owner should not forget, viz., that while lime with manure will increase the yield the continued use of lime without manure may decrease it. Lime cannot take the place of fertilizers nor can fertilizers take the place of lime. Here is a photograph of three plats showing the yield of timothy and clover from tier 3 of our fertilizer series.

| No. plat | Treatment | Yield of hay 1909, lb. | Yield all products 1882-1906 |
|---|---|---|---|
| 22 | Manure, 6 tons<br>Lime, 2 tons | 5784 | 18016 |
| 23 | Lime, 2 tons | 1880 | 11632 |
| 24 | No treatment | 1040 | 11663 |
| 16 | Manure, 6 tons | 4008 | 17383 |

Plat 22 has had six tons of manure once in two years and two tons of quick lime once in four years.

Plat 23 has received the lime the same as plat 22, but has not been manured, while plat 24 has had nothing done to it during the past twenty-eight years. Another plat (plat 16) not shown in this picture has received the same amount of manure as plat 23 but has not received any lime.

Having demonstrated the importance of clover or other legumes in maintaining the supply of nitrogen and having emphasized the importance of lime where needed in maintaining a good stand of clover the next step is to demonstrate the importance of commercial fertilizers in maintaining meadows. In 1903 the Cornell Station began the study of timothy from a great variety of standpoints. Among the experiments started was one to determine the influence of fertilizers in increasing the yield of pure timothy hay. A piece of well-worn but not exceedingly infertile land known as Dunkirk clay was used. It was the intention to seed the timothy in 1903 with wheat. The land was prepared and fertilized that fall but rains set in and prevented sowing the wheat. Oats and timothy were, therefore, sown in the spring of 1904. The chart shows the actual average yield per acre of timothy hay obtained from the different plats during 1905, 1906 and 1907.

Average Actual Yield of Timothy Hay per Acre During 1905, 1906 and 1907.

| No.of plats | Treatment | Weight, lb. |
|---|---|---|
| 8 | Nothing | 2901 |
| 1 | P. | 4233 |
| 1 | K | 4490 |
| 1 | N | 4530 |
| 1 | P, N | 4797 |
| 1 | P, K | 4127 |
| 1 | K, N | 5127 |
| 6 | K, N, P | 6615 |
| 1 | 10 tons manure | 5093 |
| 1 | 20 tons manure | 7293 |

Commercial fertilizers were applied in the fall of 1903 as previously stated and directly to the timothy in the spring of 1905, 1906 and 1907 just as the grass was starting. Stable manure, however, was applied only in the fall of 1903 and in the fall of 1906. In the latter case, of course, as a top dressing. The average of eight nothing plats during three years shows a yield of timothy hay of about 1½ tons. The yield obtained from plats treated with commercial fertilizers varied from two to over three tons per acre, while the plats receiving yard manure varied from 2½ to 3½ tons. In order to show the effect of the fertilizers more distinctly this chart has been prepared.

Timothy Hay on Dunkirk Clay at Cornell University.
Average Results 1905, 1906, 1907.

| | Apparent increase in yield, lbs. | Net annual gain to fertilizer, 4 years |
|---|---|---|
| N .................. | 1211 | $1.71 |
| P .................. | 682 | 1.13 |
| K .................. | 988 | 2.03 |
| N, P .............. | 1614 | 1.91 |
| N, K .............. | 2082 | 4.55 |
| P. K .............. | 1079 | 1.85 |
| N, P, K............ | 2632 | 5.46 |
| 10 tons manure.. | 2975 | 9.37 |
| 20 tons manure.. | 5175 | 14.60 |

N—160 lbs. nitrate of soda.
P—320 lbs. acid phosphate.
K—80 lbs. muriate of potash.

Note that N stands for 160 pounds of nitrate of soda equal to 25 pounds of nitrogen, P for 320 pounds of acid phosphate equal to 50 pounds of phosphoric acid, and K for 80 pounds of muriate of potash equal to 40 pounds of potash. The manure has been estimated in this state at one dollar a ton or load. The first column shows the apparent increase in yield due to the treatment, that is to say, it shows how much greater that yield was than on adjacent unfertilized plats.

The yield of oats in the year 1904 is not shown in this chart. While the fertilizers caused an increase in the yield of oats, the increase was not sufficient to pay for the fertilizers. In preparing the second column, therefore, in order not to overestimate the value of the fertilizers the loss from the use of them when applied to the oats has been subtracted. It is evident from this table that nitrogen was the most important element in increasing the growth of timothy on the soil in question, and that next to that potash caused the greatest gain in weight. However, as is usually the case a complete fertilizer gave a larger yield than any two elements. Counting yard manure worth one dollar a ton the great value of stable manure is shown in producing timothy. The value of the manure may be stated in another form. Neglecting entirely the increased yield of oats due to the application of manure and estimating timothy hay at $10 a ton the manure was worth $2.18 a ton or load when ten tons were applied and $1.94 when twenty tons were applied. As the experiment progresses the smaller application of manure becomes relatively more valuable per ton of manure applied. In general terms a ton or load of manure produced about two dollars' worth of hay when the latter is worth $10 per ton.

This experiment emphasizes the readiness with which timothy responds to fertilizers of any kind in this humid climate. Almost any good tillable land in Pennsylvania can be made to yield from two to three tons of hay per acre in an ordinary season. In 1908 the Pennsylvania Experiment Station weighed twenty-fou tons of well-cured hay from 5 2-3 acres. The previous year certain portions of this same area yielded at the rate of 5 tons and 189 pounds of hay per acre, although the weight of the whole field was not determined in that year. In 1908 the Experiment Station had two fields in timothy and clover. From one field of nine acres 42 loads of hay were obtained, from another field of exactly the same soil type eight loads of hay were obtained from twenty acres. The first had been well farmed, the second had not.

The whole story of the timothy meadow experiment has not been told. The most important part of the story is yet to follow. The purpose of this experiment was not primarily to determine the direct value of commercial fertilizers in increasing the yield of timothy hay but to determine whether the fundamental principle underlying the old Flemish proverb was sound, namely, that good grass was essential to a good agriculture.

After these plats were in timothy for three years they were plowed up and planted to corn without the addition of any fertilizer whatever in order to determine the residual effect of the fertilizers on the subsequent crop. These results have not yet been published but Professor J. A. Bizzell of the Cornell Experiment Station has furnished me the detailed results in which it is shown that the eight plats which during the previous year had received no fertilizer, gave an average yield of 30.4 bushels of corn per acre, while the six plats which had received a complete commercial fertilizer gave an average yield of 56.8 bushels or a gain of 26.4 bushels, while the two plats which twice in the previous four years had had two applications of stable manure gave an average yield of 67½ bushels, or a gain of 37.1 bushels per acre. A handsome profit had already been made from the use of commercial fertilizer and the stable manure. The gains, therefore, represent almost clear profit since the only additional cost was that of harvesting the increased yield. This is taking no account of the increased yield of stover which was nearly, although not quite, as marked as that of the grain.

Even to the hardened investigator these results come almost as a revelation. It is all so simple. All that was done was to apply broadcast by hand at the right time from one-tenth to one-fifth of an ounce per square foot of a commercial fertilizer containing the pr[illegible]er proportion of nitrogen, phosphoric a[illegible]l and potash. If, however, results which have been given are to be duplicated the greatest care must be taken to have the conditions and methods correct. To obtain the best results three things are essential: (1) there must be a proper stand of grass. (2) the fertilizers must be applied at the right time, (3) the fertilizers must be of the proper character.

One reason why good results are obtained by the use of commercial fertilizers on grass land is due to the fact that there are so many plants to the acre and that the soil is so full of plant roots ready to make the fullest use of fertilizers applied. It is highly important also that the plants growing upon the land shall be the right kinds. Not only will the wrong plants or weeds reduce the quality of the hay but they usually reduce the yield because generally they will not produce the same weight as would the timothy or clover which they displace. Where, therefore, the meadows have run out and a poor stand of grass remains, the land should be plowed, limed if needed, and put into a systematic rotation. There will then be a stand of grass that it pays to maintain by the use of commercial fertilizers. As an illustration a trial made at the Pennsylvania Station during 1909 may be mentioned.

The Pennsylvania State College has recently added a run down farm of 200 acres to its holdings. A certain twenty-acre field which was in wheat when purchased was this year in grass, mostly timothy. The land was too poor to obtain a good catch of clover, although an abundance of seed was sown. Even the timothy was a poor stand. From 11.7 acres of this plat six loads of hay were obtained. These loads were not weighed but if we estimate them at 1700 pounds each 875 pounds of hay per acre is obtained. On the remaining 8½ acres on April 5, 1909, just as the grass began to grow, commercial fertilizers were applied at the following rate per acre: acid phosphate 150 pounds, muriate of potash 50 pounds, sodium nitrate 150 pounds. From this 8½ acres eleven loads of hay were obtained while from the 11.7 acres unfertilized but six loads were obtained. If the loads are again estimated at 1700 pounds per acre the yield in place of being 875 pounds per acre was 2200 pounds per acre. The cost of the fertilizer not including the cost of application was $5.57 per acre or about $8.40 per ton of hay. While this is a fairly satisfactory result it is not what it should have been because of the poor stand of grass.

The second important consideration is the time of application of the fertilizer. It is very important that the commercial fertilizer should be applied just when the grass begins to start in the spring. The station is of the opinion that a delay of even a week at this time may seriously interfere with the effectiveness of the fertilizer. In order to get the best yield of hay it is essential to get a good, strong growth during the cool, moist portions of the season. It is during this time that we have the least productive soluble nitrates in the soil and hence doubtless the nitrate of soda supplies the necessary nitrogen in the right form for the plants.

Third, in order to get the best results with commercial fertilizers on grass lands, it is necessary to apply a commercial fertilizer containing the right proportion of nitrogen, phosphoric acid and potash. No absolute rule can be laid down for all lands and conditions, but for average conditions the application to grass lands of 25 pounds each of nitrogen, phosphoric acid and potash is recommended. This may be obtained by applying 350 pounds of a 7—7—7 mixed fertilizer or by applying a mixture composed of 150 pounds of nitrate of soda, 150 pounds of acid phosphate and 50 pounds of muriate of potash. It will be noticed that the ordinary mixed fertilizer commonly used for wheat and corn is relatively too high in phosphoric acid and too low in nitrogen.

There is time for only a word about pastures. While quantitative results have not been obtained it has been abundantly shown that pastures may be improved by the application of either natural or commercial fertilizers. Where pastures are heavily grazed and the animals fed little or no other food, usually they gradually decline. If, however, the cattle are fed considerable concentrated food, especially of a highly nitrogenous character, or if the pastures are top dressed with manure or commercial fertilizers they may steadily grow better. An occasional application of seed, the clipping of the weeds and the harrowing of the fields will also contribute to this end.

The one lesson above all others that the Pennsylvania Station desires to teach, is that the soil cannot be made fertile economically at a single stroke, and that land can only be kept up to its highest productive capacity by a carefully and wisely ordered system of cropping, cultivation and fertilization.

In the address made a year ago the speaker suggested as a means to that end a five-course rotation that might meet the needs of many farmers. The rotation recommended was corn, oats, wheat, each one year, and timothy and clover two years. On a limestone soil the following fertilization was suggested: for corn, six tons of manure per acre; for oats, no fertilizers except when beginning to build up the soil, in which case 150 pounds of acid phosphate was recommended. For the wheat apply 350 pounds of acid phosphate and 100 pounds of muriate of potash. No fertilizer was recommended for the first crop of hay, for the second crop an application of six tons of yard manure applied the previous summer or fall and if yard manure is not available the application in the spring just as the grass begins to start of commercial fertilizer just recommended for grass lands.

Another rotation is here suggested, not because it is any better than the one previously recommended but merely to show the responsibilities of building up the soil through the application of commercial fertilizers to grass lands.

A Seven Course Rotation.

| Year Crop | Fertilizer | Am't |
|---|---|---|
| 1..Corn | Yard manure | 6 ton |
| 2..Corn | Yard manure | 6 tons |
| 3..Oats | Nothing | |
| 4..Wheat | Acid phosphate | 350 lbs. |
| | Muriate of potash | 100 lbs. |
| 5..Clover and timothy | Nothing | |
| | Nitrate of soda | 150 lbs. |
| 6..Timothy | Acid phosphate | 150 lbs. |
| | Muriate of potash | 50 lbs. |
| | Nitrate of soda | 150 lbs. |
| 7..Timothy | Acid phosphate | 150 lbs. |
| | Muriate of potash | 50 lbs. |

Modifications of this rotation will occur to every practical farmer. The purpose here is to indicate the application of our present knowledge of the means of maintaining soil fertility to actual farming conditions and to emphasize the importance of some system if the best results are obtained.

A Member—I was just going to say something about the practice of putting lime on grass. In south-eastern Pennsylvania, when I was a boy, the farmers always put lime on the land before it was put in corn. I am now working a farm on which there was a large kiln thirty years ago, and you can see the good effects of it in land that has been in clover and blue grass ever since. I have never seen heavier clover.

The President—I guess we will have to move on. We will now have an address on "Success with Alfalfa", by Mr. E. T. Gill, of Haddonfield, New Jersey. Before he begins, I want to announce the following committees:

Committee on Resolutions: Prof. H. E. VanNorman, Thomas Sharpless and J. E. Dodge.

Committee on Nominations: R. L. Munce Dr. Carl Gay, W. W. Blake Arkcoll.

Auditing Committee: James Blair, Henry Palmer.

Committee on Banquet: Prof. H. E. VanNorman, G. B. Brown, and W. C. Norton.

If any of you have not yet paid your dues, the Treasurer, Mr. Lantz, is here, ready and willing to take your dollar at any time.

Mr. Lantz—I just want to introduce myself. Perhaps some of these people don't know me. I am a little timid about asking for money. I have quite a good deal of my own money scattered throughout the state because I am too timid to ask for it. Now, if I have to write to the members of the Association and ask them for their dues, it will take a two-cent stamp for every letter, and another for the receipt, and it will cost you two cents to send me that dollar. So please don't ask me to write to you for it. Just hand me your dollar while you are here, and I will give you a receipt for it. The Association needs the money, and we also need a great many new members. I don't wish to flatter Dr. Hunt, but I will say that this one lecture this afternoon will be worth to us our membership fee for the entire year. Please, therefore, don't hesitate to look me up and pay your dues.

The President—It is not only your dollars we want, but we want your help in the live stock industry of this state. We need your help as well as your dollar.

The audience adjourned to the court yard, where to listen to the Sheep Demonstration given by Mr. H. Noel Gibson, of Millbrook, New York, who spoke as follows:

## ALFALFA IN THE EAST

### E. T. Gill, Haddonfield, N. J.

As I have listened to the interesting speakers address this great audience, I have been deeply impressed with the importance of agriculture and the vastness of our opportunities. 'Tis truly said that the farmer is the bone and sinew of a nation, for the feeding of the people is the most important, honorable and scientific occupation of man. The wealth of a nation, its social status and all that makes for its betterment can be measured by its agriculture more than by any other

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industry. When at this age you find young men and women leaving the farm or ashamed of their work, depend upon it they are lacking proper education and training to fit them for this most important of occupations. Let all the schools teach the science of agriculture and mankind will worship, through nature better understood, nature's God.

It has been said, and properly so, that corn is king and I have been invited here today to speak of the queen of forage crops— alfalfa. King and queen they sit together on the agricultural throne, ready to feed at all times all animals necessary to man. Together they make a balanced ration, the corn supplying the carbohydrates, the fuel for the body, while the alfalfa supplies the protein to make muscle and milk. Alfalfa is not a new plant. All the agricultural papers write of it and probably every farmer before me has had more or less experience with it. For thousands of years it has been grown in Europe. From Spain it was taken to Chili and 50 years ago it reached California; so that today thousands of acres are grown throughout the West. Arthur Young, in his travels in France 120 years ago, speaks of seeing alfalfa there and the necessity of using lime, etc. From the minutes of the old Philadelphia Society for the Promotion of Agriculture I see one of its members grew alfalfa 110 years ago in Delaware with considerable success, and probably abandoned it because of the difficulty in plowing, as in those days their farm implements were crude.

Alfalfa is the most profitable crop a farmer can grow. It is more certain than wheat and does not impoverish the land as wheat does. When once started there is no annual reseeding. Today land is selling in Kansas for $150 per acre that cost less than $10 ten years ago. Today in New Jersey and Pennsylvania 3 to 6 tons per acre of alfalfa is grown that sold in the market last winter for from $25 to $27 per ton. The experiment Stations declare, and I know from experience they are correct, that a ton of alfalfa, properly cured, is worth as much for feeding as a ton of bran. Not only is it valuable as a food for animals but it is the greatest soil enricher known to man. It gathers its nitrogen from the air and with its wonderful root system it penetrates the earth from 5 to 20 feet, going down where no other plant roots go and reaching the mineral elements of the lower subsoils, bringing them to the surface and converting them into merchantable commodities. They push down and down, making humus and nitrogen far below where any other roots have put it, depositing it there for future use; through these innumerable perforations the rains filter, carrying down other fertilizations from the surface.

I believe there are portions of every farm in Pennsylvania where alfalfa can be successfully grown. Take your hillsides, make them rich in humus, add plenty of lime, inoculate, sow your seed and you have it. Wherever corn and jotatoes will grow, so will alfalfa. It is too late now to sow alfalfa and in this locality I would suggest sowing between August 20 and September 1. Now we will suppose you intend sowing a field next year—I will tell you how I would do it. Say you have a corn field. Cover this field now with good stable manure, for it will add both humus and fertility. Next spring as early as possible plow this field and spread over it a ton and a half of lime, for lime is one of the most necessary things for the successful growth of alfalfa. It not only corrects the acidity of the soil—for alfalfa will not grow in acid soil—but the alfalfa feeds on lime. A ton of alfalfa hay takes from the soil 54 pounds of lime. The ash of alfalfa contains 40 per cent. of lime, while timothy hay ash contains but 19 per cent.

If you are so situated that you can get ground limestone use four or five tons of that on an acre, but if your soil is acid better use first in addition to ground limestone 20 bushels of caustic lime, as the ground stone is not so active and may not correct the acidity soon enough for the plant. A few days after the lime is spread sow 1½ to 2 bushels each of Canada field peas and oats. These will be ready to harvest for hay the last of June or first of July and as soon as completed, while the soil is moist, disk the field over several times each way. This is better than plowing as the capillarity of the soil is not affected. Continue disking and harrowing the land to maintain a good seed bed and conserve the moisture. During one of these cultivations and on a cloudy day or later in the afternoon apply broadcast to each acre 500 pounds of inoculated soil from an old alfalfa field. The sun destroys the bacteria in the soil, therefore it must be covered immediately. Now that your seed bed is perfect and manure, lime and inoculated soil have been properly applied, you are ready to sow your seed August 20. Be sure to see that your seed is free from dodder and other pernicious weeds. To try its vitality place 100 seeds between blotting paper in a dish and keep moist. In two or three days you may count the percentage of germination and know the value of your seed. Use western seed from high non-irrigated lands. Apply 30 pounds per acre broadcast and harrow lightly, after which roll thoroughly. If you have a T bar roller so much the better, as it firms the soil and at the same time leaves a dust blanket, this preventing the escape of moisture. With the seed, or just before sowing it, apply to each acre the following: 150 pounds ground bone, 200 pounds acid phosphate, 50 pounds muriate of potash. This mixture of 400 pounds should be applied each year immediately after one of the cuttings and is better than using stable manure, as it adds no pernicious grass or weed seed. Furthermore in the application of manure the heavy wagons mash and injure the crowns, especially of the young plants, while the nitrogen and humus of manure can be more profitably used on other crops as alfalfa provides these for itself.

There is no more trouble in curing alfalfa than there is in curing green clover. At Haddon Farms we start the mowers just as soon as the little shoots show at the crowns. To cut before this time seriously injures the plants, especially while young, and if shoots get long enough to allow the mowers to cut them off the following crop is diminished. After the mowers, follow immediately with the tedders to loosen up the green alfalfa. When well wilted we put it in windrows with a side-delivery rake, where it lies for two or three days. Then two windrows are rolled together with the side-delivery rake, thus exposing the alfalfa next to the ground to the sun and wind, and very soon it is rolled up, either by hand but mostly with the old dump rake and hauled to the barns. By this treatment the hay is handled almost entirely after it begins to dry with the side-delivery rake and most of the leaves are retained. Should it rain the windrows are allowed to dry out as much as possible and then the side-delivery gently turns it over again to the sun. By this method we may, if rainy, have some colored hay, but we prefer this to no leaves which often results by the continual moving and turning when capped, which is an expensive performance, often destructive to the plants where the cocks stand too long and seldom practiced on Haddon Farms.

## SHEEP DEMONSTRATION

### H. Noel Gibson, Millbrook, N. Y.

Sheep are apt to develop parasites where they run for a great length of time on the same land. You can run them in one place for one or two years, but after that time they are sure to become infested. However there is a cure for it. If people gave one-half as much time and attention to their sheep as they do to their dairy animals, they would not have half as much trouble. It is just as easy, and a good deal easier. There is no getting up at four o'clock in the morning, and no washing or sterilizing, or anything of that kind. All you want is a little horse sense, and you will get along. Now, I don't mean to say anything against any branch of farming, but there is no reason why the farmer should not do a little in the sheep line in connection with his other lines. Any farmer who has fifty to a hundred acres of land, should have fifteen or twenty ewes. The sheep will always deposit their manure on the highest ground, and help to fertilize the land where it is most needed, but they never lie on the low land.

The middle west is producing lambs at present, and bringing them probably two thousand miles to our markets. These lambs should be raised right here at home; there is no reason why it should not be done very easily and profitably. In fact, it is our duty to do so. If the west had any competition in the meat production, there would not be this case of boycott that there is now going on. Another point to remember, is that if the West decided to boycott the East, there would not be enough meat left in the East to carry any one of our cities for a week.

Now, we have two lambs here. They are both Shropshires from the same farm. Now, when I go to the market and look over the different lots of lambs, I want to buy a lamb that is close to the ground, with a good leg of mutton, and a good spring of ribs.

Now, of these two lambs, the larger one on my left is 350 days old, and the one on my right is 308 days old. The difference in their weight is twelve pounds. They were fed practically on the same feed. The same rule holds good in sheep as it does in beef animals—you must have a good, short leg, a good body and a good digestion. This lamb, from the killer's point of view, is a good lamb, and very well developed in the higher-priced cuts of meat—the cuts that command the most money. From the farmers' point of view, a little better conformation would be what we want.

Now I might say a few words in connection with starting the flock. In the first place, you must take your market into consideration. Right here you have a very good market for hothouse lambs, but the man who has no facilities to market them should not undertake to raise them. He should raise them to sell at from 6 to 8 months old. For this purpose I would recommend some of the Down breeds—also the Dorset would afford an excellent means for the farmer to continue his flock.

Now, in starting a flock, it is well to get ewes that are not too old. You cannot do better than to go to the West, and get some of the Western ewes. When the lambs are six to eight months old, they are ready to go to market weighing sixty to eighty pounds.

You take some of our heavy-boned sheep of the West, and put them on our light soils, and they will not do so well. Any place West of the Rockies, they will do very well.

Another point to take into consideration in starting a flock is the output of wool. While some of the best mutton sheep run a little light in wool, that can easily be overcome. This little lamb has one of the best fleeces I ever saw on a Shropshire sheep.

Now, I have told you all I know, and perhaps more than I know. Have you any questions? Perhaps I can answer them.

Dr. Hunt—What is the value of these sheep if put on the market today?

Mr. Gibson—There is very little difference in their market value. The difference would be in the profit they would make. I would take the one with the short legs and heavy body first.

A Member—Tell us how to care for sheep.

Mr. Gibson—I will start with a flock of ewes. Feed them through the season, a little grain and a little hay. You will have to use your judgment. A little oats and bran will be very good, if you have them. Then we will suppose we approach within a month of lambing time. Some of your ewes may be strong, and some may be weak. Select your weak ones and feed them a little better, until they receive a pound a day. Keep your ewes in pretty good condition, so they will have a supply of milk for the lambs when they are dropped. Many a lamb is lost because the ewe has not enough milk to feed it with. Then, when lambs come, take your ewes and confine them in a pen for two or three days, and feed them some milk-producing food, such as bran, hay, and some of the oil meals. Or, in the spring, turn them into a piece of rye. You will find it an excellent thing for them, and they like it. Leave them there for a month or six weeks, and then turn them into a field of clover. Your lambs will probably develop stomach worms there, but that can be overcome. Feed them on rape, and then you will not need to feed them any corn until you are going to market them. They will gain on rape as on no other green feed for ninety days, making a gain of forty-five pounds, and in this way you can avoid the stomach worm. Or, there are a number of preparations on the market, which I have every reason to believe will do what is claimed for them.

A Member—What sort of ewes would you buy?

Mr. Gibson—Well, in buying ewes, I would want the legs as close to the ground as I could get them planted, and with a good length of body and good spring of ribs.

A Member—What breed of lambs is it best to raise?

Mr. Gibson—That depends for what purpose they are intended, if for hot house lambs, the Dorset, probably, because it can be bred at any season of the year.

This completed the morning program, and the meeting adjourned until two o'clock P. M.

## CARCASS DEMONSTRATION

### Pro. S. W. Doty, State College, Pa.

## SCHOOL OF VETERINARY MEDICINE

Gentlemen, we will now have a carcass demonstration, using the two lambs, one a Tunis-Dorset cross, bred by Henry Palmer, and the other, a pure-bred Shropshire, bred by our Treasurer, Mr. Lantz. These lambs were both shown on foot, and were killed yesterday. The steer that was shown on foot was also killed, and will be used by Prof. Doty this morning in demonstration. When he is through, if there are any questions, he will answer them. I have the pleasure of introducing Prof. Doty of State College.

Prof. Doty spoke as follows:

Gentlemen—This carcass demonstration, as I understand it, was to be upon the program of your meeting to give you an opportunity to study the good and bad points of the mutton and beef carcasses, and, inasmuch as these are the carcasses of the animals that were judged on foot the other day, it should show something of what is necessary in the live animal to produce the best carcasses.

We will take the mutton carcass demonstration first: The most important cuts of the lamb carcass are the leg, loin and rack, named in order of value. Formerly, the saddle, which includes the loin, was the most important cut and the leg was not considered quite as valuable, but today things are somewhat changed and the leg of lamb is now in greater demand than either the saddle or the rack and it is also higher-priced on most markets. The breeds that show the greatest development in the regions of the high-priced cuts are of course considered the most valuable for mutton purposes and we find this condition to a greater or less extent in any of the strictly mutton breeds of sheep. The sheep should be developed in the regions of the cheaper cut—brisket and neck for instance, only sufficiently to give symmetry of form.

Before cutting the carcass the principal thing to note are the covering, the general quality and the confirmation of the carcass. By covering we mean the amount of fat there is over the fleshing part of the carcass. We want that evenly laid on, and well distributed in a firm mediumly thick layer—not patchy. Sometimes we find a heavy layer of fat across the loins, and back or down on the sides, a condition very much objected to by butchers. Quality is indicated in the carcass by the general make-up thereof. It is also indicated by the appearance of the meat fibre and general covering.

Of the two carcasses before you, the Shropshire is a little more compact, and, perhaps, a little smoother. I think it has not quite as much leg in proportion to the size of the animal as the Tunis-Dorset, and for that reason may not be quite as valuable, but I think it shows more general quality. Both are, however, deficient in the leg. They do not carry down far enough. The Shropshire is not quite as thick as the Tunis in the lower part, along the line of the breast, where you want it to be light.

In the Tunis carcass we have the heavy tail-head which is characteristic of that breed, and it is also not quite as fat. He is somewhat roughly covered and a little thin at the shoulders. It is in fact a little coarse, and the Shropshire is not finished quite sufficiently.

The Tunis is somewhat large in the neck. That is long and heavy, while the Shropshire is somewhat more compact in this part, and therefore lighter. I would judge that the neck of this Shropshire weighs about three-quarters of a pound. which is about what we desire. The Shropshire neck is small and slopes right into the shoulder. The Tunis would have to be cut off higher up, and that is waste. To sum it up, I would say that the Shropshire carcass shows up a little the better from the butcher's standpoint.

Now, are there any questions? I am going to cut them up into wholesale cuts, making the cuts according to the Chicago methods, which I understand are somewhat different than those of Philadelphia. Before going on with the cutting, however, I might remark about the different methods of dressing. We have the back setting, as is seen in the Tunis carcass and the round dressing as is seen in the Shropshire carcass. Either is good but the latter does not show up the inside of

the carcass as well. The back setting method is usually used on lambs and the round dressing on sheep.

In cutting up a lamb, they are sometimes first split in halves then, again, they are cut without splitting. When not split the entire loin makes the saddle of lamb, and the last ten ribs on each side make up the rack. If split the rack and loin are cut into chops. The first cut to make is to remove the cheap cuts, and that is done by cutting into the flank at the stifle joint here and cutting to the point of the last rib. Then we cut up to the forearm here, leaving the forearm on the point of the brisket. Now, in that cut you have the cheap meat removed. It comprises the flank, the lower part of the brisket, and the forearm. As I said before, it is desirable to have that as light as possible. In Philadelphia they have a different method of cutting both beef and mutton. I have never had occasion to see it done. The method of cutting I have shown you here is the one employed at practically all of the market centers except Philadelphia.

Now, you see in removing the shoulder in this way, you leave no ribs at all in the shoulder cut. This makes what we call a thirteen-rib Philadelphia rack. When cut the other way, we have a ten-rib rack, which we consider more desirable. The meat is tenderer as there is not so much articulation in the muscles back of the shoulders. The ten-rib rack will sell for ten cents a pound more than the thirteen-rib rack, inasmuch as it is a more desirable piece of meat. This shows the two different racks; the one known as the Chicago and New York rack, and the other as the Philadelphia rack.

This lamb (the Shropshire) is a little thinly covered over the loin, and still not objectionable. People object to an excessive amount of fat on chops.

This Shropshire shows better quality all through. It is a better grade of meat, and it also seems to have a finer grain.

The above are some of the points that will show what weight is put upon the different parts of the carcass on the various markets.

Now, gentlemen, we have here the carcass of the steer shown on foot the other day. While I did not see him on foot, I should say he was just in good feeder condition and would grade as butcher stock on the market. He has no excessive fat on any part of him, in fact not enough for the best markets. The first essential in the beef animal is the muscle or fleshing part of the animal, and then the finish of the animal consists of fat in the right places to produce the best results. Now, gentlemen, in the beef animal the cuts of high-priced meat lie along the back and hindquarters. This animal shows a thick round, but he does not carry down well enough behind. In fact, the round is not well enough developed in comparison with the forequarters. This shoulder is pretty deep down through and it lacks fleshing and finish. You can feel the shoulder bone here. Another thing; it is not thick enough through the "eye of beef" to be a desirable carcass. Now, you will notice the covering. You don't expect to get as much in some places as others, but there should be enough to cover the muscle so that it cannot be seen. From three-quarters of an inch to an inch of covering is very desirable, and it should be well distributed across the back and along the sides. Now, this animal, as I see it, would have finished up somewhat rough. The fat, for instance, is a little too thick at the butt of the loin and around the tail head. Another thing about the fat: it should be white and firm. This covering is firm enough, but it is a little too dark colored. You will notice on the score card that the quality of the fat is given certain weight.

The loin is not quite as thick through as we would like to have it, also there is not fleshing enough over the ribs. It is not thick enough to be a desirable carcass.

As I said before, there is a little too much weight down here in the brisket, which is the cheapest cut of meat. While it is not so thick in proportion to the depth, there is too much of it. We desire just enough in this region to bring out the parallelogramic conformation of the animal. Anything in excess of that is undesirable. I imagine this animal on foot gave the appearance of being too heavy in front, with the hind quarter not sufficiently thick and heavy, also it must have shown lack of finish.

Any questions?

Prof. Cochel—From the butcher's standpoint in the Philadelphia market, is this steer in the right condition?

Prof. Doty—He is not fat enough for that market, I should judge. On the other hand, an excessively fat animal is not desirable on account of there being too much waste. You want just enough fat to make a sweet, juicy tender meat. If you have too much fat, it goes to waste, and if you have not enough, you have a dry, unpalatable piece of meat.

A Member—How much does this steer weigh?

Prof. Cochel—960 pounds on foot; I think he weighs now 540, making about 53 per cent.

Mr. Doty—A good beef animal should dress out at least 58 to 60 per cent. of carcass. The dressing percentage is regulated to a great degree by the condition of the animal, the fat animal dressing out noticeably higher than the thin one. This is easily understood inasmuch as the weight of the offal remains about the same in either case, with much more weight in the fat carcass. The ability to estimate the approximate dressing of animals is necessary if a butcher expects to buy right.

Quality in the live animal is an important factor in the dressing percentage and no doubt the indications of quality were brought out when the animal was judged on foot. In the carcass, quality is indicated in more or less the same way except that we have other indications to go by, such for instance as the smoothness of the various parts and the condition of the muscle fibres.

The carcass will now be cut into the various wholesale cuts, in accordance with the Chicago methods (The Philadelphia butchers having a method of their own, with which I am not acquainted).

The carcass is first quartered by making the cut between the twelfth and thirteenth ribs. Here (in Philadelphia) all ribs are left in the front quarter. We, however, cut one rib in the hind quarter to add weight to it and to keep the loin in good shape for cutting steaks.

I would like to call your attention to the "eye" of beef. Note please, that the muscling is very thin. It should be at least 4½ to 5 inches thick through and be covered with ¾ of an inch of fat to be considered good. This cut shows up to a very good advantage, the extent of the marbling in the carcass, (by marbling we mean the intermixing of fat with the muscling fibre). This feature of marbling, of which you see very little in this carcass, regulates to a large degree the thickness of the muscling. It is a characteristic of the well-bred beef animal.

Dairy bred animals and grades usually place the fat more on the external and internal surfaces of the carcasses. Whereas the beef animal will mix the fat with the muscle fibres throughout the carcass, thus making a much more juicy and a sweeter meat.

The wholesale cuts of the fore quarter are the prime ribs, square chuck, plate, neck and arm, named in order of value. The first cut to make is to start here about 10 inches to 12 inches (depending upon the thickness of the carcass) down from the top of the carcass on the last rib and cut straight across through the lower part of the shoulder and brisket, removing the fore arm. This removes the plate and arm from the higher-priced cuts. These latter cuts being used for stews, corning or hamburger.

The next cut to make is to remove the prime ribs. This is done by cutting down between the fifth and sixth ribs, counting from the front, thus leaving the back seven ribs of the front quarter in one piece, as you see here. This is one of the most valuable cuts in the carcass and is used for roasts almost entirely. The roasts from this cut are used as standing, folded or rolled, as the case may be.

Next remove the neck from the square chuck. It is a cheap cut and is used for corning or hamburger. The square chuck may be cut into the following—cross ribs, chuck ribs and shoulder piece.

The hind quarter is made up of the loin, rump and round. We first place the hind quarter on the block with the inside up and strip out the kidney fat.

Also remove the flank by cutting from the stifle joint to the point of the rib or a few inches above, depending upon the thickness thereof. Then we turn the quarter over and remove the loin from the round by making the cut from the rise in the pelvic arch down to the stifle joint. This cut should strike the edge of the hip joint if properly made, just as you see here.

The loin is the most valuable piece of the carcass and is usually used as steaks. The steaks of the loin are spoken of as follows; the hip bone sirloin coming from the butt end, the wedge bone sirloin coming next and the "T" bone or porterhouse steaks from the front end of the loin.

The rump is removed from the round by cutting across under the pelvic arch. It is used as roasts principally and is a very desirable piece of meat. Following down on the round and cutting parallel to the above cut the round steaks are obtained as shown in this cut.

A Member—Where does the pin bone steak come in?

Prof. Doty—That is a cut I am not familiar with.

A Member—In the Philadelphia market we have what we call a pine-bone steak. It is made by cutting right along here. You follow the sirloin in the hip bone.

Prof. Doty—This gentleman will show you the Philadelphia method of cutting; I am not familiar with it.

After the gentleman from Philadelphia had shown the Philadelphia method of cutting, the Association passed into the court yard to see the awarding of prizes to the horses.

# DAIRY CATTLE JUDGING DEMONSTRATION

## Prof. H. E. Van Norman, State College, Pa.

Thursday, February 3, 1910, 10 o'clock A.M.

Mr. Perham in the Chair.

The President—The meeting will please come to order. Prof. VanNorman will now give us a Demonstration on judging Dairy Cattle.

In taking up this subject, we are looking for the outward signs of inward ability. The man who is judging a beef steer is judging him for what he is, while a man who is judging a dairy cow, is judging her for what she can do. It is very much harder to judge an animal for what it can do, than for what it is. Fortunately for us, Nature has certain laws, and in so far as we know these laws, we can take advantage of them. The fact that we don't know these laws does not excuse us when we make mistakes.

We are trying to find out what Nature's signs of ability to produce are and whatever I may say to you is based largely upon observation—a sort of a summary of the judgment of experienced men. I cannot give you figures to prove them. or substantiate many of the statements I may make. The data we have has been taken from the production of a large number of cows, whose records have been kept from year to year. When we compare them with the conformation of the animal, we find certain effects upon which to base our judgment. What I am trying to give you this morning, is my opinion based on these facts. I have had passed around a "score card", so-called, which we use at College. This is not an end, but simply a means to an end, and that is, a tool to teach our students to be better judges of dairy cows, and to read the signs properly; we have arranged them in something like systematic order, because the man who is systematic in his efforts, is apt to be more successful.

I went into the barn of a man who was very successful, and I asked him "how do you pick out a good dairy cow?" He said, "I don't know; you college fellows are always asking such fool questions. I just look at her, and if I like her, I take her." Other men will have signs; one will look at the hole in her shoulder, and another will have some other little fancy point. There may be no relation between these points and the ability of the cow, but when we go over the cow as a whole, we find some common points in all good dairy cows. They do not always pan out right. Sometimes we find a cow that seems to have all our points, and yet she goes wrong. It is just like the bank presidents whom we trust, but occasionally one goes wrong.

As a rule you do not find in the same animal large meat making ability and large milk producing ability. Governor Hoard calls it a matter of temperament—the inward tendency to go to milk or meat.

A good dairy cow should never get fat when she is in milk. It is her temperament to turn her feed into milk. Now, things are comparative in this world. We measure distance by comparing with the yard stick. We will measure cows by comparing one with another. So we do not so much need to learn what constitutes a perfect cow, as what we shall avoid in looking for a good dairy cow.

We have two cows here, representing two different breeds. I believe that we are getting more and more to the same type in our leading dairy breeds. Why? Because Nature seems to have associated a certain shape with performance, and the closer we come to this conformation, the more nearly sure we are of our production. We talk about the Dairy Shorthorns of England. That is simply a meat cow with a dairy conformation.

Beginning with the head, the first point that you will find on the card, is the muzzle and nostril. We want a large opening in the nostril, because constitution is a point of vital importance, and the cow that is doing an immense amount of work has to have an immense amount of fresh air, and we want a large opening to enable her to take in that air. We want a good, strong lip, because strength of lip suggests strong digestion.

Looking at the face, we want it to be clean cut, because even in the structure of her face, the dairy cow wants to be free from the meatiness. A clean cut face makes for intelligence, and we want an intelligent cow. We want her dished in the face. I don't know why, but the best dairy cows have this feature. Then, we want a prominent eye, a bright eye, a mild eye. There is a great difference in eyes. Some men have reduced this ability to read the signs almost to a science. One man whom I know, and he is a man of national reputation as a cow man, says he can judge a cow if he can simply see her eye. Most of us cannot do that, but still it is true that the eye is an important sign—whether it suggests a mild disposition, or a nervous disposition; whether it suggests strength or weakness.

The ears, and the horn we want reasonably fine. You get a cow with a large, coarse ear, and a large coarse horn, and a general masculine contour, and you have a beef animal. The dairy cow's chief duty, milk making, is a function of motherhood, therefore we want her feminine. When it comes to the neck, the same thing holds true. You want a strong, thin, short neck. Why? As Abraham Lincoln said "as long as a man's legs are long enough to reach the ground, that is all that is necessary", and so long as a cow's neck is long enough to reach to her shoulders, that is all that is necessary. But, "handsome is as handsome does", and it is not only beauty but ability too, that we are looking for. We want a reasonable neck—not a thick neck, because that makes for beef again.

Now, working back, we want her thin over the shoulders. I don't know why, except that in examining the records of a thousand cows, the best producers were all narrow across the shoulders. That narrowness which is brought about by the spinal column coming up above the shoulder blades, and by the absence of meatiness.

Then we want the shoulder points wide apart, because it gives greater lung capacity; a cow that is eating fifty pounds of silage a day, and, in addition, eating her hay and drinking her water, must have ability to digest it. The dairy cow must be wedge-shaped, narrow across the withers, wide at the shoulder points and across the hips, deeper from the loin down than through the heart, with a large belly.

We want the back straight. Some one says it does not make much difference whether the back is straight or crooked. Well, a straight back is suggestive of a strong spinal column, strong bones, strong nerves, and a strong nervous system. A cow drinks, often, a hundred to a hundred and fifty pounds of water at one time. Add to this her fifty pounds of silage, and she has a great amount of weight to carry. If in calf, she has additional weight to carry, and a strong back gives her ability to carry it. The back is made up of a number of little bones, and these spinal processes are separate. In this cow they are close together, but in the Holstein they are more open, and what might be considered a loose back in the Jersey or Guernsey, would be a very close back in the Holstein.

Then we come to the loin, which should be strong and well developed. I like to see the hips wide and prominent, and I want to see them sharp and clean cut. If you will take a beef cow that is thin, and examine her, and take a dairy cow that is thin, and examine her, I think you will find that the beef cow has a rounder bone, while the dairy cow has a more angular bone. Therefore I like to see that bone angular. In this cow you can get almost a triangle. You want a prominent shoulder bone in the same way.

I think the Ayrshire has the habit of carrying more flesh than the other dairy breeds, so we must be careful and not allow the flesh to deceive us.

Now comes the rib. I did not hear Mr. Cochel yesterday, but I can pretty nearly imagine that he told you a good beef animal wants to carry out straight here. The dairy cow is different. When we look at some of those productive animals that you and I have seen at the International Live Stock Shows, we can pretty soon tell the difference. In the dairy cow we don't want the straight rib. It should not start at the spinal cord and run out straight. It should have a curve, and when it comes from the lung, it should curve very perceptibly. We rarely find a cow lacking in that and yet is a good producer. Occasionally we find a cow lacking depth, but of greater length. What she lacks in depth, she makes up in length, but as a rule, we want her deep, rather than long. Another thing, the ribs of the dairy cow slope back, rather than run down straight. In the dairy cow we want them wide apart. In this cow there is room for three fingers between her ribs. The Ayrshire is a little more closely knit than some of the others. The bone of the rib should be flat. An old cattle buyer that I ran across placed a great deal of stress on this one detail. He would walk up to a cow and feel her ribs, and if they were round, he would say "No; she will take care of herself." That is, her first tendency in feeding would be for maintenance, while in a good dairy cow, her first tendency is for milk.

Going back to the rump, we want good width here, with the bone pushing out like this, so as to leave room for the maternal function. Then, we want a good length from hips to pin bones; I don't know why, but it seems to be a fact. Again, on this pinbone, we want the same sharpness that we spoke of in the hipbone. Next, we want a strong tail; not coarse, but long with a good brush, because it makes for production. There is a channel there through which the spinal cord is carried out into the tail. Great stress is laid by some breeders upon the length of the tail. They want it to run down to the hocks, claiming it is an evidence of productivity. Personally I do not believe much in it, but in judging cows, it is well that there should be as many good points as possible, so that this length of tail is a desirable thing to have along with the rest.

Next comes the ham or thigh. It comes up in-curving in the dairy cow. Why? Because when it out-curves, it suggests beefiness.

Then this flank; we like to see it come up pretty well. I don't know why, but it is so in the best dairy cows. Then, coming to the udder, it is the machine, the organ, that turns the feed that was given to the dairy cow, into milk. If you have a cow that normally gives fifty pounds, or forty, or thirty-five pounds of milk and kill her you won't find that much milk, as we know it, in the udder is not in her udder, nor does it exist in any other part of her body as milk. This udder is, therefore, a marvellous organ, composed of tissue and cells, with power to take from the blood, and in some mysterious manner, transform it into milk, which operation is completed while she is being milked. It is full of nerves and secreting tissue, with enough muscle to support it. As this is the place the milk is made, we want just as much of it as the cow will support.

The legs should stand rather wide apart, with plenty of room between them for the milk machine. The udder should be covered with a soft, fine skin. You should see the veins, as you do in high bred trotting horses. One of the strongest characteristics of the Ayrshire is the strong udder, carried well forward, while one of the most prominent characteristics of the Holstein is the lack of fore udder. It seems to be a characteristic of the Holstein to have what we would call "the pendant udder", while the Ayrshire carries forward to a marked degree. The teats should be well developed and squarely placed, fairly wide apart, and long enough for convenience in milking. The front quarters should not be higher than the hind quarters, but it is difficult to get them that way.

Then come the milk veins. That seems to be one of the contradicitions of bovine nature. They have no milk in them, and do not bring any milk from the heart to the udder, but rather carry blood from the udder to the heart. As a matter of fact, from the heart there is a large artery running through here, entering the udder where it starts, and then coming back to this vein, and from there back to the heart. Now, if the udder is making the milk out of the blood, we want lots of blood coming to it, therefore, we look for a large milk vein as an indication of a large amount of blood passing through the udder. We not only ask that the vein shall be large, but that it shall be crooked. Run your hand over this cow gently, and see how very large this vein is, and it is also very crooked. Students of animal anatomy tell us that wherever you find veins and arteries carrying large amounts of blood, you will also find them crooked. Coming to the hole through the wall of the abdomen, we want this well developed because it does not profit us to have a large vein if we have only a small opening through the wall. Some cows make up for a rather small milk vein, by having two or more of them. On this Holstein I find it strong. The Ayrshire has a particularly small vein, and if you will notice, on this cow you will find that it is very far back. In some cows they are within four or five inches of the shoulder.

The next and last point in the conformation is the legs. Personally I do not pay so much attention to this. The cow has to have legs enough to carry her, and we don't want them hocked too much, or coarse, we want them to be fine, in relation with the rest of the body.

Now comes the skin. To a cattle man, the skin is an important sign of the inherent quality and condition of the cow. A cow may be so out of condition as to show a hard, coarse skin. The skin is a sign of physical condition. You don't want it too thin, but not many cows have a skin that is too thin. You want a soft, mellow skin. The finest skin I ever saw was on a big Holstein bull. I have forgotten his name,but his skin was very soft and mellow. The skin is also an indication of the feeders' skill, and the softness or hardness of the skin is also an indication of the physical condition of the animal.

We have been going over this animal, and we want to sum up some of the conclusions we may draw from it. First, the cow should be wedged-shaped; square here, thin over the shoulder joint, wide here, and over the withers. When we look at her from behind, she is a little narrow in the hock. Excessive narrowness is not desirable. Then another most important point is the side wedge, the thickness of this portion (loin down) as compared with this (through the heart). Some people make the mistake of thinking that we want this front depth shorter than the hind depth. I would state it the other way. We want the hind depth greater than the front depth. A distinction without a difference, probably, but we want all the depth we can get here in front, and then a little more behind. It makes for feeding capacity. The cow cannot take a large amount of feed unless she can handle it, and the ability of a cow to produce milk depends largely upon the amount of food she is able to digest. Occasionally you will find a little cow that is all right, but as a milk producer, I would rather have a cow with large digestive capacity.

I made some interesting experiments a few years ago. I went into a herd where there were over nine hundred records, and picked out every animal which had made over 6500 pounds of milk a year, for three years or more. Then I went over it and found those that had made less than 5500 pounds. Then I went to the herdsman, and had him go with me and pick out the twenty-five cows that had a record of over 6500 pounds for more than three years, and without exception, every one of those cows had this conformation—wedge-shaped, deep here, and deep through the chest and bone, angular in type.

I don't want to advertise any particular breed, but Schreiber's pictures of Hay's Rosy and France VIII, are magnificent specimens of the dairy type. Now, if you go over the pictures of the record cows in the agricultural press, you will find that they approach very closely to this type of cow. As I said before, the shape of body in the different dairy breeds is getting closer and closer to a common type. True, there is a difference in the color of the hair in the Holstein and the Ayrshire and the Jersey, but taking it all in all, the shape is very similar in the good cows of the two breeds.

Coming to the last point, the temperament: that is a hard thing to read. It is the thing that distinguishes the beef cow from the dairy cow. It is the sand, the nerve that makes the little horse pull more than the big horse. Some of you may have played football, and you know that at the very last, one man may be able to put in an extra spurt. We see two men go into the game, and one has the nerve, the temperament, to enable him to put in a last winning effort, even when he seemed to be doing his very best before. It is not necessarily nervous excitability, but the ability to put the final energy into a thing and make it a success. Take this cow, here, standing here and chewing her cud, and see how contented she is in here, with all these people around her. Part of that is education, because you can educate cows, as well as educate boys. Part of it is temperament. If I read her right, if she went into a fight with a dog that worried her, she would come out the winner, and we want a cow that will go into her feed in just the same way. It is the same spirit we see in the man who, when he was sick, said he wouldn't die; he would get well; and he did get well because he refused to die. That is the disposition you want in a dairy cow. Size does not count so much as the other qualities.

You can form your ideal of a dairy cow, and then when you find her, put her in your herd, and you will soon have a profitable herd. I went into a little herd some time ago, and it was a pleasure to see it. Whoever selected it had an eye to type, to that uniformity which makes for beauty and indicated skill of the true cattle man.

Then you want a good sire. You want him for his ability to transmit to his daughters the good qualities he inherited from his mother. In selecting a sire, you want to go back to his mother, and get the record of her ability and temperament and productivity.

Do you know what it cost you to produce a hundred pounds of milk last week? Do you know what it cost you to actually feed your cow last week? Did you know what each cow actually brought you? Five cows may make a profit of a hundred dollars, and yet one cow take ten dollars more feed than the others. We might eliminate her and still have a hundred dollars profit. Another cow may just pay for herself, and you might eliminate her, and still have your hundred dollars profit on the three cows. In order to make money in the milk business, a man must study his herd, and each cow in his herd, and he must keep a record of her cost and production. If he does not, he will have to get out of the milk business sooner or later. Now, are you willing to pay the price, what is it? It is study—the study of your cows—the study of your methods, the study of your figures. The time has come when it is necessary to combine book farming and practical work if you want to succeed.

Mr. Keim—Is there any way in which we can judge our calves when we are raising them any more than a general outline?

Prof. Van Norman—Well, it is pretty hard to judge a calf, but in a general way you want the same type in the calf as in the cow.

One thing more about a good bull. If three or four men would agree to go out and each get a good two-year-old bull and then exchange with each other every two years they would in that way each have a good bull for six years at the cost of one bull.

Now I suppose we will have to close this demonstration without any discussion. There is a sheep demonstration outside, which most of you will want to see.

## HOW CAN WE IMPROVE OUR CORN?

### Prof. F. D. Gardner, State College, Pa.

Friday, February 4, 1910, 2 o'clock P. M.

The first event of the afternoon was the auction of the prize corn, followed by the sale of the apples exhibited by the Pennsylvania Horticultural Association. The Champion ten ears of Improved Leaming were sold to Vance McCormick of Harrisburg for $16; the second prize lot, of the same variety to Dr. Adams for $7, and the third prize, same variety, to Dr. Gilliland for $15. The Grand Champion Ear of Boone County White went to Dr. Marshall for $7; the first prize ten ears same variety, to Henry Fielden for $6; second prize, same variety, to J. E. Dodge for $10; third prize, same variety, to L. B.

Hansen for $6. First prize Ninety Day corn went to Dr. Marshall for $11; second prize to Dr. Adams for $5.

After the auction, President Norton took the Chair.

The President—Gentlemen, you will please come to order, and we will take up the discussion of "How Can We Improve Our Corn?", to be led by Prof. Gardner. I have the pleasure of introducing Prof. Gardner.

Prof. Gardner opened the discussion as follows:

Mr. Chairman and Gentlemen—I am very glad that this is to be a discussion, and that you are to take part in it. I am not here to do all the talking; simply to lead the discussion. I am always willing to advocate anything that will improve our corn, and give the farmer an increased yield and a larger financial return.

There is a great deal that can be done, it is true, by building up the soil, by the better preparation of the seed bed and by the rational use of manure and fertilizer, but I want to speak today more especially of the improvement of the corn itself by selection and breeding. All realize the value and importance of good breeding in live stock, and I want to say to you that the same principles apply in the breeding of both animals and plants. It is just as important to have well-bred and well-selected seed corn as it is to have well-bred and well-selected animals.

In the selection and breeding of corn, it is well to use only the varieties and strains that yield well. In the selection of seed corn we should always look for the ears growing on good stalks—and accept only those that have their desirable characteristics well marked. For instance, you will note that this Champion ear is not only a large ear, but it is different in regard to the character of kernel than the 10 ears exhibited from the same lot of corn. I will venture to pronounce this ear a sport, and the man who exhibited it discovered something worth while. I hope that the man who bought it will have it tested and compare its progeny with that of other ears, in order that he may report results another year.

After you have discovered something that promises to be of value, the first thing to do is to find out if it really has value.

When in search of an animal as a sire, there are three things to take into consideration. First, the pedigree of the animal; second, his appearance, and third, if possible his performance. The same three things apply to corn. You can tell whether it is fine looking or not but you cannot tell by appearance what the performance of the seed will be. How are you going to find out? Simply by planting by the ear row method—each ear planted in a row by itself, so that you can ascertain if it will give a big yield of a good quality of corn. In a corn show you cannot know that; all you can know is that it looks well. If you have twenty or thirty ears of fine seed corn, plant each ear in a row by itself and see whether certain rows give you a better production than others. Then, in harvesting, you should harvest each row by itself, keep the corn separate and select your seed from a few of the rows that promise best.

I was very much interested in a little slip of paper which you saw in the corn exhibit, explaining ten exhibits of three ears each. Those ears represent the product from each of ten ears exhibited last year. Each ear was planted in a row by itself and the yield of corn from each ranged all the way from five and a half bushels for the lowest to eight bushels for the highest. This variation was undoubtedly due to the inherent power of those ears to produce, and it is up to the grower to select seed for his next year's crop from the rows that produced best.

The ear-row method of planting corn gives the greatest chance for rapid improvement. It not only enables the grower to increase the inherent yielding power of the corn but enables him to change other characters such as height of stalk, position of ears or time of maturity. Corn that is too late for a certain locality may be made to mature earlier by selecting seed from the early maturing stalks. Out in Illinois by using the ear-row method of breeding corn in experiments extending over ten or twelve years, they have changed the composition of the corn, increasing the protein, and fat in one strain and decreasing it in another.

A Member—Can you increase the protein very much without decreasing the yield?

Prof. Gardner—Yes, it is possible to do so, but in this case there was a small decrease in yield. That is something you must look out for. Breeding for the greatest possible development of one character often results in a deterioration of others.

A Member—What is the difference between the highest and lowest protein?

Prof. Gardner—Nearly double, and becoming greater each year.

I don't want to make much of a talk; I believe we can get more out of it by having sort of an experience meeting.

A Member—How far apart are the experimental rows?

Prof. Gardner—Just as far apart as the others.

A Member—Has the pollen mixed?

Prof. Gardner—Corn is naturally a cross pollinated plant. A man starting with one ear does to at a disadvantage, because the resulting stalks are all from one mother plant; they are closely related and the result is injurious. When ears are planted in separate rows it is desirable to detassel alternating rows and select seed ears only from the detasseled rows. All kernels on such ears are the result of cross pollination.

A Member—In planting seed corn, is it not a good idea to get an ear as near to the ground as possible?

Prof. Gardner—I advocate having nodes as close together as possible. At each node a leaf is produced and the leaves are to the plant what the boiler is to the steam engine. They are the lungs of the plant, and the more leaf surface you have, the greater the power of the plant to manufacture corn. Furthermore, the leaves are the most palatable and nutritious part of the stalk when used as forage.

A Member—Is it desirable, as a rule, to have suckers on the stalks?

Prof. Gardner—Not as a rule.

A Member—Does the position of the ear on the stalk have anything to do with the length of time it takes it to ripen?

Prof. Gardner—Not especially. If the ear is high, there is generally more stalk, and the chances are that it will ripen a little later than the low ear, although this does not necessarily follow.

A Member—To what extent does detasseling increase the production per acre, and is it of greater advantage to detassel every other row rather than every other hill?

Prof. Gardner—Quite a number of experiments have been tried along this line; in some of them there was a slight increase in yield, while in others there was a little reduction. On the average there was no material difference the first year. Theoretically the progeny of the detasseled rows would be the more productive.

A Member—Would it be to advantage to de-tassel every other hill or every other row?

Prof. Gardner—So far as the immediate effect is concerned I don't know that it would make any material difference; it would be more convenient to de-tassel every other row. I might say that in our breeding plat each row is planted from a separate ear.

A Member—Is there any advantage in de-tasseling every hill in a row, or would it be better to de-tassel every other hill, in the preparation for seed corn?

Prof. Gardner—It would be better to detassel the whole row; because if you detassel but one hill, and leave the one next to it, the de-tasseled hill will receive pollen from the next hill in the same row. All plants in any row are closely related, being from the same mother plant and it is to avoid close pollination that we resort to de-tasseling alternating rows.

A Member—Is it better to pull the tassel out, or to cut it out?

Prof. Gardner—It can be pulled with less injury, if done at the right time, than if it is cut out. In cutting you will be apt to injure the leaves, and make a worse wound than if you pulled it out at the proper time.

A Member—You could not de-tassel six rows, and then leave six rows?

Prof. Gardner—I have not seen it tried. If satisfactory pollination would result, it would facilitate harvesting when the whole plant is harvested. I have seen good results where they de-tasseled two rows and left two, and I also know of an instance where they de-tasseled two rows and left one.

A Member—If we could de-tassel four, that would be sufficient?

Prof. Gardner—Yes; that would facilitate the cutting and shocking of the corn.

A Member—How do you make the seed test for the yield of the corn?

Prof. Gardner—Well, we usually do it when the corn is standing. This year at State College we cut and shocked each row by itself, but that would be somewhat impracticable for the farmer.

A Member—You just worked it out on small plots?

Prof. Gardner—No; it was in a small field, with rows three or four hundred feet long.

A Member—You just worked as much as you wanted to use for seed in that way?

Prof. Gardner—Yes.

A Member—If two distinct varieties are planted side by side, say a long-grained variety in one row, and a short-grained variety in the other, which would predominate in the crossing?

Prof. Gardner—I do not think there would be any marked difference the first year..

A Member—In other words, if you detasseled the long-grained variety, how much influence would the short-grained variety have on it the following year, if you used it for seed?

Prof. Gardner—Probably about one-half of it would be medium, one-quarter short grained, and one-quarter long grained.

A Member—What would be your procedure, then, if your corn showed a tendency toward a short grain, thus producing a deficiency in kernel?

Prof. Gardner—I would increase the depth of kernels by selection and breeding or secure seed of a new strain that would meet my ideals in this particular. It would not be wise to attempt the desired improvement by crossing two varieties that differ greatly.

A Member—What would be the result of a violent mating?

Prof. Gardner—It would be rather disappointing; you would secure a rather small percentage of desirable types and it would take several years of selection to fix the character which you might desire.

A Member—What could you do the second year to make it come true?

Prof. Gardner—You have a cross between a very shallow grained variety and a very deep one. The result would be a limited number of deep grained desirable ears. In order to fix the new type you will have to select and plant by the ear-row method, selecting the seed ears from the rows, the product of which most nearly conforms to the desired type. In this way it will take several years to accomplish the desired results.

A Member—You would have to de-tassel the short variety, or the long variety?

Prof. Gardner—You would now have a new variety, which it would take several years to perfect.

A Member—In selecting these, you would put two rows side by side, and select them the same way?

Prof. Gardner—No; I would plant by the ear-row method, isolating the seed patch as far as possible, so as to avoid outside pollination. I would then select my seed from those rows that produce kernels desirable in depth. I would continue the selection and breeding in this manner until the desired result could be secured.

A Member—In de-tasseling, does it have any bearing on the size and quality of the fodder, as well as on the ear?

Prof. Gardner—Not that I know of.

A Member—For instance, the fodder of one variety is very long and that of another is very short; do you know whether the male or female predominates in that case?

Prof. Gardner—Neither predominates so far as we know.

A Member—Suppose a man has alongside of good corn, one row of an other variety from which he wishes to select seed, is it best to de-tassel the row that has been planted alone, or to let it fertilize the other corn.

Prof. Gardner—The first is correct, if you have only this one row to select from. The effect from the pollination of this one row on the field would be very slight because it is only one row in many.

A Member—Which corn would predominate?

Prof. Gardner—The immediate product from the individual row of corn would not differ materially from the seed, but the progeny of this would be intermediate between the two varieties.

A Member—Which has the greatest feed value, and which will produce the greatest number of bushels—the white or the yellow corn?

Prof. Gardner—We have made a great many experiments on that, and there is no material difference. In the North we grow the yellow corn more extensively and on an average it will outyield the white. In the South, the white will outyield the yellow. When we take the average of the two sections, there is practically no difference in the yield. Chemical analyses of many samples shows the average composition of the white and yellow to be identical.

A Member—Professor, do you mean to say you cannot select ten ears here that would be representative of the production of that corn?

Prof. Gardner—Yes; you cannot tell by looking at it whether it will yield thirty or fifty bushels to the acre.

A Member—But would it not be fair to assume that corn that will produce deep grains on the cob, will produce deep grains in the field?

Prof. Gardner—Oh, yes.

A Member—But the deep grain will produce a greater amount of kernels and a smaller amount of cob, will it not?

Prof. Gardner—That does not represent the production per acre. A man might produce eighty bushels of the shallow grained variety against seventy of the other. If you will look at our score card, however, you will find that we allow for the corn rather than the cob.

A Member—What is there about self-pollinization? That is the principle upon which our best cattle breeding is being conducted. If you want to perpetuate a strain, it seems to me that advantage should be taken of this principle.

Prof. Gardner—If it did not happen to be corn, you could probably do it. With any plant there is self-fertilized you could do it, but corn is strictly a cross-fertilized plant. A number of experiments testing the effect of self fertilization in corn show conclusively that is very injurious.

A Member—Let me give you an example: The Spaniards brought the Andalusian horse over into Mexico. The escaped horses from them inter-bred and produced the Broncho, and there is no tougher horse than the Broncho. These stallions bred to their own daughters, to "their sisters, their cousins, and their aunts", and the result is that there is no tougher horse today than this Broncho.

Prof. Gardner—But you can also carry that principle to such an extent in breeding live stock so as to produce a weak animal.

A Member—It is a case of the survival of the fittest.

Prof. Gardner—But that may be carried too far.

A Member—While in corn, it is the desire of the grower to have the greatest possible depth of grain with the smallest amount of cob, is it not possible that this may be carried to extremes? Is there not a greater feeding value to the cob than is supposed, ninety-nine times out of a hundred? I don't recall the feeding value of the cob, but I believe it is larger than is generally supposed.

Prof. Gardner—It is very low; but we don't want the cob too small. We want the diameter of the cob to equal one-half the diameter of the ear. We want a cob big enough to hold all the grain that the plant is capable of developing.

A Member—Do you think you can produce two ears to the stalk without losing any of the food value, or losing the value of the ear in fertility?

Prof. Gardner—Well, it is possible to produce two ears to the stalk by simply selecting. As to the second part, I don't know that I quite understand what you have reference to.

A Member—Whether it is possible to produce two perfect ears without loss of value in one of those ears from the quality of the fodder?

Prof. Gardner—I don't believe that makes much difference. The one ear stalk is probably better than the two ear stalk. The two ear stalk produces a relatively smaller ear.

A Member—But if you could produce a two ear stalk, could you not increase the fertility, so as to make the two ear stalk of the same value as the one ear stalk?

Prof. Gardner—That is a very pretty theory, but I don't know.

A Member—Now, we must object to this small grain because it is too hard for the horses to chew it. I want to know whether it is not a waste of material to feed it to horses at all?

Prof. Gardner—That is out of my line.

,A Member—Where can we find a score card?

Prof. Gardner—It was given in last year's report.

A Member—What is your advice regarding the cultivation of corn after it has tasseled?

Prof. Gardner—In very dry seasons I have known cases where it was of very great benefit to give shallow cultivation even after the tasseling period.

A Member—Up in Monroe County, where I farm, I planted a field half in yellow corn, and half in a deep red, and when I came to harvest it I found a number of ears of a peculiar bronze shade, which is, I think, the most perfect corn I have ever seen. I have kept these bronze ears for seed. Now, in planting, do you think they will come true?

Prof. Gardner—The larger part of it will probably revert back, but by selecting in this way for some years, you will probably be able to fix that characteristic.

A Member—Will the corn growing in the tassel produce the same kind of corn?

Prof. Gardner—Yes; the corn growing in the tassel was probably the original form of corn. The occasional occurence of corn in the tassel is probably a reversion to the original type.

The President—We will now take a few minutes to hear the report of the Committee on Resolutions. Prof. VanNorman will have to return to the other meeting.

Prof. VanNorman thereupon read the following Resolutions, which were adopted by the Association unanimously, section by section, in the regular way:

## REPORT OF THE COMMITTEE ON RESOLUTIONS

WHEREAS: A new form of milk contest, designated as "canned milk" was introduced at this meeting, and

WHEREAS: Dr. Jos. F. Neff, Director of Public Health and Chief Milk Inspector David Clegg, and their assistants, gave most valuable aid in collecting the samples, and making the contest an unqualified success, be it

RESOLVED: That a vote of thanks be extended to these gentlemen by this organization for their services.

WHEREAS: The Milk Exchange of the City of Philadelphia has rendered most valuable assistance and co-operation at this meeting, and

WHEREAS: They arranged for a milk contest among the patrons shipping milk to Philadelphia, and offered a hundred dollars in prizes to encourage dairymen to exhibit, be it

RESOLVED: That the members of the Dairy Union tender their thanks to this organization, which is doing such valuable work in this city.

RESOLVED: That the members of the Dairy Union tender their thanks to all the speakers at this meeting, to the local press, and all others who helped to make this meeting in Philadelphia one of the best, if not the best, in its history.

WHEREAS: The Dairy Division of the United States Department of Agriculture has rendered valuable assistance at our meeting by sending Mr. B. D. White and Mr. Helman Rabild to address our meeting and score the milk,

RESOLVED: That we hereby tender our thanks to the Secretary of Agriculture for the valuable assistance offered by these men.

WHEREAS: Dr. Louis A. Klein, Dean of the School of Veterinary Medicine, University of Pennsylvania, and Doctors Marshall, Gay, and their colleagues, through their valuable assistance and cooperation, made possible the live stock exhibits and helped to make our meeting a success, be it.

RESOLVED, That the thanks of the Association be extended to these gentlemen for their most excellent work.

WHEREAS: Dr. H. C. Campbell gave most valuable assistance in the milk con test by the chemical and bacteriological examinations of it, be it

RESOLVED: That we extend a vote of thanks to him for his most valuable services. And be it further.

RESOLVED: That the thanks of this Association be extended to Dr. Thomas F. Hunt and Prof. Gardner of the State College for judging the corn; to Mr. J. B. McLaughlin, of Columbus, Ohio, and Mr. R. Penn Smith of Strafford, for judging the horses.

WHEREAS: The public is becoming educated to the relation between unhealthy cattle and unwholesome milk, and

WHEREAS: Cattle breeders and milk producers are beginning to realize that tuberculosis in their herds lessens materially their profits, and

WHEREAS: The present conditions relating to the control of tuberculin testing, the indemnity for loss on cattle slaughtered to prevent the spreading of tuberculosis and the prevention of the sale of unwholesome milk, are incomplete because of changes in conditions, and the appropriations made heretofore for carrying into effect these provisions have been insufficient, and

WHEREAS: Legislation on these subjects requires most careful consideration in order that cattle owners may not be subjected to irreparable loss; that the funds of the State may be spent to full advantage, and that the public may be adequately protected from the sale of unwholesome milk, be it

RESOLVED: That the Pennsylvania Dairy Union appoints a committee of three and that it requests the appointment of a similar committee by the Pennsylvania Live Stock Breeders' Association, the Pennsylvania State Veterinary Medical Association, and the State Medical Association, and that these committees act jointly and in conjunction with the State Live Stock Sanitary Board and recommend to the Legislature suitable and adequate legislation relating to the control of tuberculin testing, sufficient indemnity for cattle slaughtered to prevent the spreading of tuberculosis and the prevention of the sale of unwholesome milk, and that upon the passage of this Resolution, the Secretary shall send a copy of the same to the Secretary of each Association named herein.

WHEREAS: The fraudulent sale of oleomargarine is a serious menace to the legitimate market for honest butter, and

WHEREAS, Present laws have proved inadequate to prevent fraud, therefore be it

RESOLVED: That this Association urge its members, and all engaged in the dairy industry to aggressive action in support of the National Dairy Union in its fight against the fraudulent sale of oleo.

(Signed) H. E. VANNORMAN,
DR. CHAS. M. SETTZER,
C. B. LANE,
J. E. DODGE,
THOMAS SHARPLESS.

This report was followed by the report of the Auditing Committee, who reported the following account of the Treasurer to be correct:

## TREASURER'S REPORT

Mr. Lantz—This report gives our receipts for the year, and of this meeting to date, but it does not include the expenses of this meeting. I will be here after the meeting has adjourned, to receive any further dues that the members may wish to pay.

The President—We might as well finish the reports of the Committees while we are at it. Is the Committee on Nominations ready to report?

Mr. W. W. Blake Arkcoll, Chairman of the Commitee on Nominations, made the following report:

Gentlemen, your Committee makes the following nominations to fill the different offices:

President...Hon. W. C. Norton, Waymart
Vice-President,
Dr. S. H. Gilliland, Harrisburg
Second Vice-President,
M. P. Shoemaker, Greensburg
Secretary..........E. S. Bayard, Pittsburg
Treasurer..........J. F. Lantz, Wyebrooke

EXECUTIVE COMMITTEE.

| | |
|---|---|
| Dr. C. T. Marshall | Philadelphia |
| W. S. Powell | Shadeland |
| M. N. Clark | Claridge |
| D. W. App | Selinsgrove |
| James Blair | Hartstown |
| Henry Palmer | Avondale |
| James E. Dodge | Narbeth |

LEGISLATIVE COMMITTEE.

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|---|---|
| W. C. Norton | Waymart |
| E. S. Bayard | Pittsburg |
| Dr. C. W. Gay | Philadelphia |
| Dr. Thomas Turbnull | Allegheny |
| H. W. Comfort | Fallsington |
| T. G. Dain | Frazer |
| J. H. Reichert | Scranton |
| W. E. Perham | Niagara |

TRANSPORTATION COMMITTEE.

| | |
|---|---|
| T. D. Harman | Pittsburg |
| D. Chester Morris | Philadelphia |
| W. F. Shrum | Adamsburg |
| F. W. Levis | Chadds' Ford |
| John W. Oakey | Bryn Mawr |
| M. E. Herber | ——— |

COMMITTEE ON STATE FAIR AND FAIRS.

| | |
|---|---|
| W. W. Blake Arkcoll | Paoli |
| E. S. Bayard | Pittsburg |
| W. C. Black | Mercer |
| James Blair | Hartstown |
| Joe Henderson | Burgettstown |
| Dr. C. W. Gay | Philadelphia |

(Signed) R. L. MUNCE,
DR. C. W. GAY,
W. W. BLAKE ARKCOLL.

On motion, duly seconded and regularly carried, the gentlemen recommended by the committee to fill the various offices, were unanimously elected.

The President—Gentlemen, I thank you for electing me President again. I have served nine years, and it is certainly a satisfaction to me to be elected again. I appreciate your kindness; it shows that you have confidence in me. I will do the best I can for the organization, but I must have your help. No one man can make this organization a success, but with the help of every one of you it can be done. We want every one here to become one of our number. In numbers there is strength, and then when we go before the Legislature to demand anything from them, we will get it. No one man can get anything from the Legislature of this State; we must present strength.

This Association was organized for the purpose of securing a State Fair. As you are aware, the last Legislature passed a State Fair bill, but when it came to the Governor for his signature, Governor Stuart did not see his way clear to sign it on account of the financial condition of affairs. We are still living, however, and we will go before the Legislature again next year, but in order to win, we must have the help of all the breeders and the dairymen and the farmers—every one of them. All these kindred organizations are working in harmony, and if we work together we will win, and I will serve you to the best of my ability.

I think there is no more business that I know of; if there is, I would like it brought before the Association at the present time.

There is one Resolution that I would like to see added. The press has been pounding the farmer for the increase in the cost of living. We have some data that should be brought before them. We know that in the past ten years there has been an increase of 20 per cent. in the population and a decrease of 5 per cent. in the production of meat. How can you expect the cost of meat to stay down?

Mr. Dodge—That was a Resolution that I wished to introduce myself, but, somehow, I could never get there when the Committee met. I see no reason why it could not be added now.

The President—We will now resume the discussion of "How to Improve Our Corn."

Prof. Gardner—I think I have noticed an improvement in the character of our corn exhibits, although the number of exhibits is only about half of what they were last year. We can explain that as due to the fact that this was a very poor corn year. The ears that are here are more uniform in character and better filled out at tips and butts than in previous years.

A Member—I don't think it would be a bad plan to have this state divided into different districts and have prizes awarded to the different districts. There is such a variety of soil and climate in this state that it is almost impossible for us to compete with each other and still have a fair show. In the South-eastern portion of the State—a section by itself—we have one variety, and in the North we have the ninety-day corn. If it were possible to grow this ninety-day corn in the South, it would not be fair to have the man from the North compete with you. I think it would be well to have a committee appointed to look into this, and I do not know of any one better qualified to fill this position than the professors at State College. Have them map out the different sections, and then offer prizes for the different sections. Of course,there might be an objection to this on the ground that there would be too many premiums, but if we can't have ten premiums, then let us have five, or offer five dollars as the first prize. It is largely a question of latitude and longitude, and this should be recognized.

Prof. Gardner—This suggestion is one that I have thought of several times, and it has been taken up at State College, but we have found it impracticable to section the State, because of the variations in soil and altitude. It may be possible that it can be done in some way. I think it is desirable that it should be done, and anything I can do to serve you in this matter, I assure you, I will be only too glad to do.

The President—Any more questions?

A Member—Is corn produced on low soil as high in protein as the corn produced on high soil?

Prof. Gardner — Theoretically, corn grown on high soil would be a little higher in protein than that on low ground. Starch is the last product that forms in

the kernels and low land would, as a rule encourage a prolonged growth, resulting in high starch and consequently a slightly reduced percentage of protein.

A Member—In the selection of seed, would it be advisable to plant seed from an ear that was not thoroughly filled out?

Prof. Gardner—As a rule, it would not be advisable, although under some conditions it might not be inadvisable. Incomplete filling out of the ear is often the result of imperfect pollination. If this is the result of isolation or not having sufficient pollen brought in contact with the silks there would be no objection to planting from such an ear so far as inherent tendencies are concerned.

A Member—Is there anything in the theory that kernels taken from the body of the ear are better than those taken from the ends?

Prof. Gardner—I don't think so. All kernels on an ear have the same breeding. Experiments testing this point have shown equally as good yields from butt and tip kernels as from those on the center of the ear when an equal number of plants are compared.

A Member—When do you begin to detassel?

Prof. Gardner—As soon as the tassels appear and before pollen begins to fall.

The President—If there are no further questions, we will adjourn to meet again next winter.

I think the other section is still going on, up in the other hall, if any of you desire to go there.

ADJOURNED.

## IN MEMORY OF MR. LEONARD PEARSON

### Address by James Law of Cornell University

Death has struck a shining mark, our late lamented friend, Dr. Leonard Pearson, from whom we might still have expected a long and honorable career, has passed from us in the full bloom of his manhood, in the midst of his arduous labors, and with his plans for the future achievements undone. To us who have watched the gradual unfolding of this man, and his aspirations, the first feeling is that of arrested and blighted development. With a prolonged life, and continued mental vigor, and with the opportunities which were placed in his hand, Leonard Pearson would, in the nature of things, have rounded out a noble life by continual additions to his achievements and left a record which his premature death cut short.

But with a fuller and more philosophic view we recognize that our lamented loss is common in kind with the history of the Universe. Myriads of seeds go to destruction while only one sprouts and developes into another fruit bearing plant. Of the human family even, more than half have hitherto died in early infancy, so that an endless number of possible poets, philosophers, scientists and benefactors have been thus denied to an earth in which their help is only too sorely needed. Setting four score years as the limit of human life can we feel surprised that the second half of the race should be cut off in successive portions from the first to the eightieth year? The earthly career of the individual man is short at best and strictly limited to a period beyond which none may pass. The trained brain and the stored up knowledge, no matter how large in amount, must bend under the all-conquering hand of time, and leave but a memory—a record to fade away and be lost, unless taken up by others that come in succession and use these as stepping stones toward advance and greater and more beneficent achievements. The human paragon is but one in the great current crop of his season, and he cannot last over into the season following. But if with the skill and spirit of a Burbank the noblest of this season's product is garnered, and husbanded, and planted in the best productive minds of the seasons, to come, the Creator's great purposes are thereby subserved, knowledge is increased, science is stimulated and the advancement and evolution of humanity are secured.

The mills of God grind slowly. In these a thousand years are but as a day; a long succession of generations are charged with the elucidation of a great truth, and the preparation of the human mind for its admission, and the merit accorded to each is that of making a visible and lasting advance, which turn and pass it on a stage farther and nearer toward the ultimate goal of triumph. In the case of the individual, how often do we see the man who is cut off, in comparative youth, impress on the coming generations and centuries an impulse for good which the longest and most admirable lives have failed to accomplish. It is as if the enthusiasm of youth, concentrated in a strenuous though limited period, had made an irresistible appeal to the imagination, the devotion and the will had initiated a heroic work of an exceptionally lasting and fruitful character.

My acquaintance with Leonard Pearson dated from 1884 when at the age of 16, he entered as a freshman in Cornell University. He came of sterling, New England stock modified perhaps by successful enterprise in what is now the middle West. I already know his maternal Uncle George Jones, Professor of Mathematics in Cornell, who outside of his academic life had proved a power for good in the civic life of Ithaca by entering strenuously into every movement for the repression of crime and vice, and for the fostering of all that made for righteousness. Leonard, in common with his two brothers, both distinguished alumni of Cornell, partook largely of this sterling character, and that love of truth, which is such an essential foundation for a scientific career. He elected veterinary science as his life's work, took and excelled in such work in this line as Cornell then offered, and when he graduated in science in 1888, he joined me in Chicago, seeking a practical acquaintance with the work of the federal government in the extinction of lung plague in cattle, and he there assisted in a sanitary campaign, which for speed and thoroughness, has been unparalleled elsewhere.

While an undergraduate of Cornell he was honored by the insignia of the Sigma XI a lasting sign of the esteem in which he was held in scientific circles. From Ithaca he went to Philadelphia as offering, at that time, the most promising fount in America, from which to drink more deeply of veterinary lore. Here he so highly distinguished himself that, on his graduation he was at once offered the chair of veterinary medicine, to supersede the brilliant Huidekoper, with permission to spend his first year in Europe to garner for the subsequent profit of his Alma Mater such knowledge as the older and maturer veterinary institutions of the Old World had treasured.

Young as he was, with spurs untried, it was charateristic of the man that he should consider the matter deliberately before he should enter on a race which he must perforce recognize as a strenuous one. His most thought was the question of his own fitness for the proffered position.

"Fools rush in where angels fear to tread." But Leonard Pearson was no fool, and better still he thought first of his duties to his Alma Mater; to the profession—still young in America—to which he had just been admitted; and to the great public which must gain or lose according to the character of the work which he could bring into the field. He came to consult with me on the subject, and freely expressed his hesitancy and diffidence in thrusting himself into a position which demanded so much of its incumbent, and of assuming the position of teacher and mentor of many who had sat on the same seats with him as fellow students. It was fortunate that I was troubled with no such misgivings as to the case in hand. I had myself been called to teach when I had barely attained my majority, and I recognized that with a truth loving, earnest mind there is an advantage rather than otherwise in the early and continuous drill that comes from the necessity of a readiness to respond promptly to all appeals from students; there is a valuable training in close contact with many young aspiring minds and with the many points of observation from which they will individually view the same question. All this tends to give a breadth of view which can only come through the many suggestions thus presented. Acting on the right quality of mind in a proper state of preparedness this could not fail to prove a constant stimulant to growth and advancement. And I know enough of Leonard Pearson to realize that I had this stamp of mind before me. He was far removed from that overweening and ill-founded conceit which will rest satisfied with superficial acquirements dispensed with a glib confidence, which may momentarily repress inquiry and aspiration, but which cannot stand the test of time with increasing knowledge and greater deliberation. His compunctions yielded before the same views of the case presented by the older man, he recognized at once the responsibility and opportunity which providence had placed in his hands, he went to Europe—and we all know the result.

In the recollections of a long life spent in earnest efforts at serving humanity, in my chosen field, I shall always have the satisfaction that, in an hour that called for an important decision, I gave my earnest word toward saving Leonard Pearson for that work in which he has served so faithfully and successfully.

It would be endless to enumerate the sowings and harvest of even one life. Some, however, may be profitably recalled.

Students. The primary duties of our deceased friend centered mainly along educational lines and the students who came to the veterinary department to drink of the Pierian Spring carried away with them the memory of a true friend and inspiring teacher which in different states and nations will make his name a household word for many years to come! We recognize these students and alumni in the bureaus of the nation, in the sanitary work in the abattoirs and in the fields, on government and private breeding farms, in experiment stations and halls of research—men who took inspiration from his lips, example and direction, and in whose minds his name will be associated with all that they achieved and aspired after. He finds here his truest living monument, and as many of these men will furnish inspiration to others in their turn who will dare to say that we can judge of the volume and value of such a life by what appears here and now?

COLLEGE. The college buildings stand a solid monument in stone and lime of the work of the man as it appealed to trustees of the institution, and to friends outside. Perhaps no veterinary college in the country has been more liberally dealt with. We must go to Europe to find one that is better provided for. This stands as a measure of how his qualities impressed men at large, and though ostensibly a physical memento, it is more, inasmuch as it is to be the center of college life for many coming classes of veterinarians, and like the minds of those who were his immediate pupils, though to a less extent, they must carry down to coming generations the memory of the man who was so intimately associated with their construction.

LITERARY WORK. Coming to the literary work I wish I could name in a word the many different fields in which Dr. Pearson's activities were called out. Scarce had he taken his college position in Philadelphia before he was impressed with the importance of a veterinary journal which would give the best that America could produce in this line, together with the cream of the veterinary journals of Europe. In seeking to fill the gap he found the advantage of a working knowledge of the more important of the tongues of Europe, and he spared himself no effort nor toil in making these available to his American colleagues. For years he conducted the Veterinary Magazine until induced to relinquish the labor by increasing and imperative duties on the one hand, and by the revitalization of competing journals on the other to undertake a more complete foreign summary. Transient as was the life of the Veterinary Magazine it marks a stepping stone in the veterinary journalism of America, and is a lasting monument of

the earnestness, the ability and the tireless devotion of Dr. Pearson.

The interruption of the magazine did not interfere with his literary labors for students and colleagues. Works on matters of current interest to veterinarian, student and stock owning public came from his graceful pen as translations from old world tongue, and in the fields of sanitation, the sanitation of milk, of herds and interdependently of humanity he became well known to veterinary and medical readers. He no longer tied himself down to the continuous grind necessary to go to press on a given day each month; he could now work when a spare hour came to him and he could delay any undertaking when lack of time or need of sleep rendered this imperative. It thus became possible to do better work with less expenditure of energy than when it had to be undertaken as a race against time.

THE PROFESSION. In his profession Dr. Pearson early took and held a prominent place. As a practitioner in Philadelphia, as a consulting veterinarian at the College and outside, as a referee in public exhibitions and to her collections of animals, as an expert in connection with breeding problems, and in other ways, his services were highly esteemed and largely in demand. No less was this the case in connection with societies—veterinary and medical. He was habitually the holder of some office (from the presidency downward) in the state or national societies of his own profession; he was directly associated with the Henry Phipps Institute for the Study, Treatment and Prevention of Tuberculosis; and he was President of the Animal Section in the International Congress of Tuberculosis at Washington, D. C.

SANITARY WORK IN RELATION TO INFECTIOUS DISEASES. This is the field which of all others Dr. Pearson most assiduously cultivated. The subject was in the air. The sanitarian—medical or veterinary—dreamed of the severe restriction, if not the entire extinction of infection. Dr. Pearson became a recognized authority in such matters. He was repeatedly called by the federal government to advise in cases of doubt. In Pennsylvania he was made Secretary of the Livestock Sanitary Board and by right of skill and office its executive officer. It was his to form and direct a state veterinary sanitary organization. He was especially fortunate in finding official ears open to the need of research in these lines and a state farm and a state laboratory of research were placed in his hands, stocked for the purpose and with provision for maintenance. Among other things he availed of his opportunities to place restrictions on tuberculosis. He procured a statute providing that all dairy and breeding cattle entering the state must be tested with tuberculin, by operators approved by the State In this he placed the stockmen and community under a deep load of indebtedness. Unfortunately, it indirectly imposed a corresponding evil on such neighboring states as were unwise enough not to follow suit. No persuasion could induce our New York legislators to take precautions against the danger. They ignored it as long as they dared. Cattle tested and condemned as tuberculous could be driven or shipped into New York and sold as sound animals. Cattle were selected by the tuberculin test out of our New York herds and the sound shipped or driven into Pennsylvania, while the unsound were left to make the bulk of the remaining New York herd, thus concentrating the infection and rendering the disease more virulent and deadly. Again cattle coming from the West were tested in New York stock yards on their arrival, and the sound shipped into Pennsylvania, while those left as unfit were sold into New York dairy herds. Under this systematic propagation and intensification of tuberculosis in the herds of New York, the proportion of consumptive animals increased by leaps and bounds. In 1894 the State tests of suspected herds showed 4 per cent. tuberculosis; by 1900 the percentage in tested herds, had reache 10 per cent. and upward, and by 1908 33 per cent. Meanwhile our lawmakers remained obdurate. Then as the evil grew and became too notorious the sanitary bills were first quietly pigeonholed in committee, and when this became too brazen, they were enacted, with the protective clause so altered as to appear to grant a relief which was absolutely denied. All dairy cows and breeding cattle, entering this state, were to be tested with tuberculin, but it was carefully added that this should not apply at any point where the Bureau of Animal Industry maintained a federal inspection. The statute did not specify the nature of such federal inspections, but as such inspections of meats was maintained at all large New York stockyards, it followed that live tuberculosus cattle could still be introduced through these stockyards without any tuberculin test. The persistent purpose of sustaining an iniquitous trade and the juggling with words to prevent its interruption stands as a terrible arraignment of the committee in charge of these bills, I will not say of the entire legislature. At last when the vile odor of the wrong became unendurable, and when we secured a new Commissioner of Agriculture, the statute was really amended and long suffering New York was reluctantly allowed the privilege and protection which had pleased Pennsylvania so long before.

Under the direction of our departed friend, Dr. Pearson, Pennsylvania stockowners could have their private herds tested at State expense, and the condemned animals purchased and removed so long as the state appropriation sufficed to meet the cost. Or, the owner could segregate the affected cattle in a safe place, approved by the State and dispose of their products—milk and progeny—under proper safeguard. Few, I believe, availed of this last privilege though in the case of valuable thoroughbred stock the treasured strain of blood could thus be preserved, and the high-priced progeny raised safely on the sterilized milk of even their own tuberculous dams. One may go further and say that the milk of tuberculous cows can be sterilized and safely fed to human beings, so that under proper precautions to prevent contact with other herds and to destroy the bacteria present, the large supply of milk produced by even tuberculous herds, can be temporarily availed of for market uses, until the condemned cows can be disposed of profitably and safely. The calf with enormously greater susceptibility coming from its identity of genus and even of family, can be certainly raised on tuberculous milk and maintain perfect health, how much more then can man, whose susceptibility to the brand of the cattle tubercle bacterium is so much weaker, consume the sterilized milk with comparative impunity. My own experience with calves confirms this perfectly. In one large state institution with a dairy herd of 160 cows I found practically all tuberculous, and the extensive herd of pigs fed on the raw offal of the cows slaughtered for beef, perishing from the same affection. The very badly affected cows were at once disposed of. The less severely affected were placed by themselves until they could be slaughtered seriatim, and when fit for human food were fed to the inmates. The milk of these cows was boiled and fed to the pigs and to raise the heifer calves of the herd to take the place of their diseased dams. The tuberculosis among the pigs ceased to claim new victims, and the heifers grew up sound and in due time were used to form a new herd, absolutely healthy, and kept strictly apart from what still remained of the old one. In a few years all of the original herd had been disposed of in this way and had been replaced by a new sound herd of their heifer calves, raised on the sterilized milk of their dams. No fresh cows were brought in from outside, and for fifteen years that herd of 160 maintained a faultless record as testified by a yearly tuberculin test, and by frequent slaughters for beef purposes. The later history of the herd is. however, still more significant. The old steward of the institution died, and a successor was appointed who soon discovered that he could buy cows in the public market more cheaply than he could raise them. He was entreated to, at least, have all new purchases tested with tuberculin in the hands of a trustworthy expert. But again the spectre of prodigality appalled him. The vendors were shrewd enough to demand 25 per cent. more for every cow sold subject to the tuberculin test, so the untested market cow was preferred, and placed in the hitherto carefully preserved sanitary herd. Fatal mistake! The rational management of this large tuberculous herd, had made and kept it perfectly sound for fifteen years, then its neglect for a few years more left it just such a tuberculous group as it had been at first.

This record can be duplicated indefinitely. The most prolonged instance in my own experience is the Cornell university herd which formerly largely affected with tuberculosis, was purged of the pestilences and kept so for about thirty years. During this period in the yearly testing, a bull, or other animal, brought in from an outside herd would be condemned for tuberculosis, and in the past few years animals, bought for experimental purposes have as a rule been condemned for the same disease, but these have been invariably detected and eliminated by the yearly tuberculin test, while the University herd proper has maintained its immunity. On one or at most two occasions only an animal standing adjoining to one of these imported diseased ones had contracted the affection.

The method of dealing with herds by separation of the reacting animals and sale of the products, has been adopted more largely in Denmark than elsewhere, and has been widely advertized as Bang's method, but as practiced by Bang it comes short in one most important particular. It does not forbid sales out of the tuberculous segregated herd. It does not even seem that such a sale is conditional on a tuberculin test of the animal. The purifying of the individual herd that has been separated and held under government control is the primary object, and no additions to that herd from outside are allowed. But the sale of animals from such segregated herds, to be taken into other herds, not under government control, it is but an invitation to an outward diffusion of infection into other herds, through incipient and occult cases, and thus it becomes a loophole for the extension of the infection outward from the otherwise carefully secluded, government control herds. It is easy to free such government control herds from the affection in a few years' time, but thus is a most imperfect triumph of sanitation if other herds are meanwhile being infected by stock carried out from the secluded herd, which we are making every effort to free from infection. The two acts are mutually opposed and from the point of view of the State sanitation the evil effects of one are continually undoing many of the good effects of the other.

Bang recognizes the evil and would gladly obviate it if the thought of the community at large would sustain him in such an action. Dr. Pearson never sanctioned such contradictory measures in Pennsylvania. With him the invoking of State aid to purge a herd of infection involved the making of a contract which guarded against any future loophole for the escape of infection from the secluded herd. And this position is the only logical and tangible one. Exception to this rule could only be permissible when the animal from the secluded infected herd was to go to another infected herd and remain there, or in case it was to be kept by itself securely isolated from all other animals, or again if it was to pass direct to the abattoir for immediate slaughter.

In making this criticism no condemnation of Bang is intended. He saw and approved the more perfect way, if the less perfect was alone possible in his community, he was not so arrogant and opinionative as to refuse the lesser good which was within his power. By yielding a point he has been able, without it, to accomplish a confessedly imperfect, yet still splendid sanitary work, and at the same time prepare the mind of his compatriots for a more perfect work in the future.

SANITARY RESEARCH. In the field of sanitary research, which was liberally opened to Dr. Pearson, many lines of inquiry were followed with excellent results. Among the notable things done in the research laboratory were the identification of a pestilence of horses in America with the contagious lymphangitis of the Old World, and the future identification of the deadly dysenteric affection of imported Jersey cows and others that had lived with them, with the disease of Johne, caused by an acid-fast bacterium having a certain resemblance to the bacterium of tuberculosis. But that which was aimed at immunization against the tubercle bacterium appealed most powerfully to the great body of humanity. The great public, realizing rather dimly, it is true, that certain diseases like smallpox, sheeppox, anthrax, measles, scarletina, lung plague, rinderpest and others do not occur a second time in the same individual system, a first attack being followed by a prolonged (often life long) immunity, entertained an earnest hope and expectation that the great white plague could be met successfully by immunizing measures and that the greatest pestilence of man and beast might be finally conquered in this way. The demand became almost imperative on sanitarians to enter on this field which to the average mind appeared so promising. To the skilled and mentally well balanced pathologist, however, the field was less inviting than to the layman. Tuberculosis belongs to a class of diseases in which a first attack imparts no complete immunity for the remainder of the lifetime, nor even for a prolonged period. Some subjects of the disease unquestionably recover, having inherently a much stronger resisting power to the tubercle bacterium than have others. Some on the other hand are so little resistant that they run down rapidly to a fatal issue and die in a few weeks. If these two classes of victims were the only ones, we would have a much more satisfactory basis for a system of immunization and even for the extinction of the plague by working along well known lines. But, unfortunately, of tuberculous subjects living under good hygienic conditions, the great majority do not die promptly, nor recover absolute health in a short time, but they remain for years with dormant tubercles in their system, containing living bacteria, ready to start new centers of the disease in any susceptible animal in which they may be implanted. Many of us can recall the cases of human consumptives who had been attacked in early youth, yet attained to the age of three score and ten, all the time bearing tubercles, slowly evolving or receding, and in either case containing germs of the redoubtable disease. The individual man, suffering in this way, claims, not only the right of survival, but also that of mingling freely with his fellowmen in conducting his business or occupation. But in the case of the lower animals we have a different problem. The individual animal has not an inalienable right to life, on moral and legal consideration, nor has its owner any such right to demand this. The animal is but a chattel, if it be a living chattel, and when it has become a source of danger and pestilence to others, it becomes a nuisance and pest to be abolished or put under complete restraint. The comparative value of our one infecting bovine animal, for example, and of our 74,000,000 cattle, more or less remotely exposed to it, at once puts out of court any plea for its preservation as a mere question of economy. The government, that is the whole people, ought to indemnify the owner for the loss of any stock taken to prevent a pestilence from gaining a footing. The question of the destruction or strict isolation of infected animals must be determined by many attendant circumstances and conditions. The fatality of the affection: the diffusibility of the virus; the proximate density of the population of susceptible animals; the duration of the disease in the individual and herd; the extinction, or otherwise, in the body of the victim of the disease—germ on recovery; the prospective value of the progeny of high class or thoroughbred infected animals; are very prominent considerations in this connection.

In the disease now under consideration—tuberculosis—there are two conditions which render it possible, in desirable circumstances, to substitute a perfect seclusion for destruction.

First, The bacterium of the familiar tuberculosis in man is not readily and virulently transmissible to most cattle; and that of the most familiar tuberculosis in cattle is not so easily adaptable to man as it is to other cattle. Exceptions occur, susceptible individuals of the one genus (man or cattle) will entertain and succumb to the bacterium drawn from the other genus (cattle or man) and are then able to transmit the germ back to the first genus from which it was drawn, and to the constitution of which it has become peculiarly adapted by a long habit of living in such germs. In this way the ox, infected from man, may prove highly dangerous to man, though it has comparatively little danger for other oxen. Similarly man infected from the ox may carry little risk to his fellow man though peculiarly dangerous for the ox. If therefore infected cattle are thoroughly secluded, and if the health of the attendants and visitors of these cattle is well attended to, it becomes possible to control any escape of the bovine germ through the system of man.

Second, In the slight chronic cases of tuberculosis in cattle, which alone would be preserved for breeding purposes, the areas of tubercular deposit are usually narrowly circumscribed and largely situated in solid organs or in closed cavities from which the bacteria do not usually escape in quantities, unless in case of sudden extension or generalization. It thus becomes possible, under proper expert control, to weed out such as are becoming dangerous, and to prevent injurious concentration of tuberculosis in the herd, or the diffusion of infection to animals outside. This furnishes a sufficient basis for safe research in the disease whether in the line of attempted immunization or medical or hygienic treatment, or otherwise. But it can never excuse any laxity in the seclusions, nor, above all, any movement of animals from the secluded herds into others.

In this connection I cannot avoid mentioning the traffic from herd to herd as one of the most prolific means of spreading tuberculosis. The dealer buys from all and sundry, and the animals offered to him are too often such as the vendor has become dissatisfied with (possibly already tuberculous). He takes these animals to his stables and feeds them from mangers where other cattle are to follow in rapid succession, and where each can pick up any germs left by its predecessor. Finally all of them pass out into other herds and in many cases they plant tuberculosis. This disease is peculiarly favorable to such diffusion inasmuch as the tuberculous subject, put upon the market is usually an occult case and the disease cannot be detected by an ordinary observer.

The only other bovine malady which approaches tuberculosis in this respect is contagious abortion. The victim of this is usually in apparently good health, and it is only months after the transfer of the animal that abortion supervenes and suspicion may be aroused. The deplorable result is that, in our dense dairying districts, it is rather the exception to find a herd in which this abortion has not gained a footing. The one remaining redeeming feature is that after one or it may be two (rarely three) abortions the same cow does not repeat the act. But she still carries the germ, and may transfer it to new herds into which she may be removed without revealing herself as the true source of the trouble.

To return to the tuberculosis research. It was expected that Dr. Pearson should undertake this, and on it he went honestly to work. Like some others working in the same field, he found that under good hygienic conditions, animals with strong natural resistance to tuberculosis, under carefully graduated doses of tuberculin toxins, or when injected with tubercle bacteria which had been long grown in genera widely different from the stock experimented on, could, in favorable cases be started on a course of improvement, or could be endowed with an increased power of resistance, so that a percentage of animals with the incipient disease could be said to be cured, and another percentage in good measure immunied. But he could not shut his eyes to the facts that a large portion of the infected animals were not cured, that a number of the sound animals could not be immunized, even in measure, and that in those that did acquire a measure of immunity, it was not sufficiently powerful and lasting to constitute a satisfactory basis for a general sanitary system to be carried out by a whole community or nation. For a year, or while kept in very superior hygienic conditions, the manipulated animals escaped, but in the lapse of time they gradually lost their power of resistance and when subjected to close confinement or other specially unwholesome conditions, in the presence of the bacterium, they succumbed to the disease after the manner of other cattle. This was a denouement calculated to try the experimenter's souls. He had secured what might be called a flattering success, but at best it was too partial, uncertain and transient to be made the basis for a complete extinction of the pestilence. There was a strong temptation to make the most of it and come out as the conqueror of the great white plague. But Leonard Pearson was made of nobler stuff, and while acknowledging favorable results, he never once claimed that he had secured a good working basis for a system leading to tuberculosis extinction in state or nation. The most that he allowed himself to say was that the matter was still undecided.

I don't wish to pose as an iconoclast but it is due in our deceased friend, Dr. Leonard Pearson, that I should contrast his worthy action, with that of others who have stood high in public praise. Robert Koch, the discoverer of the tubercle bacterium, on just such an infirm basis exploited his tuberculin, putting it on the market as a great tuberculosis remedy, and concealing the method of its preparation as long as possible to indefinitely prolong his golden harvest. Von Behring, following the other line of using tubercle bacteria which were not habituated to living in the genus operated on, is still exploiting his "bovovaccine" as at once a cure and preventive of tuberculosis. It matters not that his successes were of the same partial and imperfect kind as Dr. Pearson's, his misleading advertisements still glare upon us from the pages of every stock journal. Were the application confined to man, who might claim that the help for him as an individual, may well outweigh the cost of maintaining in our midst, and indefinitely, the germ of the dread scourge, there would be at least a shadow of extenuation, but when exploited as "bovovaccine" for use upon animals alone in which the bacterium shall be stamped out once for all, it is much harder to excuse.

Leonard Pearson, however, nobly stood the test. He kept his eye steadily fixed on the imperishable prize of the true scientist and sanitarian. He swept aside every suggestion of remunerative mercantilism, and, what would have been perhaps more attractive the public applause of one who was reputed to have overcome the great white plague, and remained true to his best ideals. Let us treasure this devotion to trust as the crowning virtue of his career.

We lament his early death, but this is largely the fate of humanity. We honor him for his faithful work during his all too short existence. We recognize that real worth is shown by doing well what each successive day brings to be done. He who does this, be his life long or short, has well fulfilled his mission and well deserves the victor's crown. We cannot, any of us, wholly control and determine our life. We cannot choose that we shall be born in one century or land rather than another; that we shall grow to a given stature; that we shall have the option of building on foundations laid by great men or small ones; that we shall live and work 30 years or 80; but we can determine whether in our age and our country, with our inherited knowledge, our years and opportunities we shall make the most and the best of what is placed in our hands. "Act well thy part, there all the honor lies."

## WATKIN G. POWELL

Watkin G. Powell, a member of this Association from Wyoming, died Saturday night, April 9, 1910. Mr. Powell was one of the firm of Powell Bros., who have been for many years extensive breeders and importers of cattle, horses and sheep. He was a great student and experimenter, and perhaps no one was better versed in the laws or principles of breeding than he. A talk with him on this subject was an experience not to be forgotten, for he had made many experiments in breeding and crossing, and his fund of experience was always at command through his remarkable memory. He was associated with all efforts for livestock improvement in this state and in the country. Since its origin he had been a member and an officer of the Pennsylvania Livestock Breeders' Association, and his devotion to the betterment of livestock never failed. The meeting at Philadelphia he was compelled to miss on account of ill health, but his interest in it was attested by several letters offering suggestions for further progress. Personally he was a most genial and likable man, and he will be sadly missed by a large circle of friends in several states.

## LIST OF MEMBERS OF PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

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Jones, B. F.................South Montrose
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END OF YEAR

Author: Pennsylvania Live Stock Breeders' Association

Title: Proceedings and papers of... annual meeting, 1911

Place of Publication: Pittsburgh, Pa.

Copyright Date: 1911

Master Negative Storage Number: MNS# PSt SNPaAg057.10

# 1911

Proceedings of the Thirteenth Annual Meeting

OF THE

# PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

JOINT MEETING WITH THE

## Pennsylvania Dairy Union

AND THE

## Pennsylvania State Board of Agriculture

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Harrisburg, Pa., January 24-27, 1911

PROCEEDINGS OF THE

# THIRTEENTH ANNUAL MEETING

OF THE

# PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

In Joint Meeting with the

# PENNSYLVANIA DAIRY UNION

AND THE

# PENNSYLVANIA STATE BOARD OF AGRICULTURE

HARRISBURG, PA.

January 24-27, 1911

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## INTRODUCTION

The joint meetings of the associations representing the various branches of Pennsylvania's agriculture and animal industry made things hum at Harrisburg January 24th to 27th, 1911. The State Board of Agriculture, the Pennsylvania Live Stock Breeders' Association, the Pennsylvania Dairy Union and the Pennsylvania Horticultural Association all met at the same time and brought out a crowd that was handled with some difficulty on account of its size.

The Corn Show was not the largest that has been held by the Live Stock Breeders' Association, but the corn averaged much better than ever before. There were few inferior specimens. About 150 entries were shown.. The Pennsylvania Experiment Station also made several exhibits of corn with records of production attached.

The eastern corn growers scored this year over the western, getting away with both championship cups. The department of feeding stuffs was on hand with its exhibit, and also the Pennsylvania Live Stock Sanitary Board, which showed among other things specimens of carcasses with various diseases. The Stallion Board presented an exhibit of charts showing the location of pure-bred stallions, and also a display of photographs of great horses. The Pennsylvania Railroad had on exhibition its latest improved live stock car. Considerable of the prize-winning corn went direct to the National Corn Show at Columbus for competition there. Unfortunately some of the best had to be left behind because no classification was provided for it at Columbus.

### The Stock Show.

About four carloads of live stock, with a number of express consignments in addition, made up a show that for quality it would be hard to excel. Practically all types of horses, cattle, sheep and swine were represented by specimens of exceptional merit. The live stock demonstrations were extremely popular and those who gave them were kept on their feet a long time answering questions. The exhibition was not confined to breeding animals but included a prime steer and a common one, shown by Pennsylvania State College. These specimens were killed immediately after the demonstration on foot and their carcasses used in a meat demonstration later in the week. The same was true of the fat hog. The prime steer dressed about 64 and the barrow almost 85 per cent. The following breeders furnished live stock free of charge for the demonstrations: Vance C. McCormick, Harrisburg, Percherons; A. R. Van Tassel, Dubois, Morgan horses; M. T. Phillips, Pomeroy, Guernseys; John Y. Boyd, Harrisburg, Holsteins; White Horse Farm, Paoli, Jerseys, Shropshires and Berkshires; Willoughby Farms, Gettysburg, Berkshires; J. B. Henderson, Burgettstown, Dorsets; James Blair, Hartstown, Hampshires; J. F. Lantz, Glenmore, Shropshires; W. A. McCoy & Sons, Mercer, Southdowns; John P. Crozer, Upland, mule-foot hogs; Pennyslvania State College, Angus, Shorthorns, Chester White hogs and Delaine sheep.

## CORN AWARDS.

### Prof. F. D. Gardner, State College, Pa., Judge.

**Yellow Dent**—1st, Pusey Cloud, Kennett Square; 2d, George W. Eisiminger, Waynesburg; 3rd, Ephraim Kerr, Ickesburg; 4th, George G. Strosnider, Waynesburg; 5th, Jesse L. Eisiminger, Waynesburg; 6th, J. A. Smyser, Dillsburg; 7th, Norman Miller, Marion; 8th, Harry B. Herr, Lancaster; 9th, M. T. Phililps, Pomeroy; 10th, Burton Bayard, Waynesburg.

**White Capped Yellow Dent**—1st, Harry B. Herr, Lancaster; 2d, Milton Mendenhall, Mendenhall; 3d, D. J .Herr, Refton; 4th and 5th, George W. and Charles A. Row, Yardley; 6th, A. T. Holman, Millerstown; 7th and 9th, William Fisher, Clarks Mills; 8th, A. C. Cohick, Linden; 10th, B. B. Brubaker, New Holland.

**White Dent**—1st, J. H. Stein, Greencastle; 2d, E. G. Cloud, Kennett Square; 3rd, C. P. Orndoff, Waynesburg; 4th and 6th, S. E. Musselman, Allen; 5th, Samuel Faust, Obelisk; 7th, G. A. Trimmer, Mechanicsburg;

8th, John W. Trimmer, Mechanicsburg; 9th, Benjamin Sharpless, West Chester; 10th, H. F. Smith & Son, Wycombe Station.

**Ninety-Day Type**—1st, Pusey Cloud, Kennett Square; 2d, Jos. T. Fleming, Belleville; 3rd and 9th, W. F. Vallerchamp, New Berlin; 4th and 8th, Post Bros., West Alexander; 5th, Paul Trimmer, Lisburn; 6th and 7th, G. A. Trimmer, Mechanicsburg; 10th, Lee L. Trimmer, Mechanicsburg.

**Southeastern Type**—1st, Clarence Mellinger, Ronk; 2d, C. W. Mohler, Myerstown; 3rd, Milton Mendelhall, Mendenhall; 5th, D. C. Windle, West Chester; 5th, John Clarke, West Chester; 6th, George S. Kauffroth, Gap; 7th, Wilmer A. Twining, Wycombe; 8th, Harry B. Herr, Lancaster; 9th, Joseph G. Williams, West Chester; 10th, S. E. Musselman, Allen.

**Flint**—1st, F. A. Snyder, Pittston; 2d, Peter R. Boltz, Lebanon; 3rd, George W. and Charles A. Row, Yardley; 4th, John Smith; 5th, Mary A. Boltz, Lebanon; 6th, H. J. Gulden, Bendersville; 7th and 8th, James W. Moore, Bethlehem; 9th, Perham Bros., Pleasant Mount; 10th, M. M. Kendall, McConnellsburg.

**Grange Exhibit**—1st, Corn Growers' Association of Chester and Delaware counties, Pomona No. 3; 2d, Bunker Hill Grange 1368, Lebanon No. 3.

**Grand Champion Exhibit**—Pusey Cloud, Kennett Square, Yellow Dent.

**Grand Champion Ear**—Clarence Mellinger, Ronk, Yellow Dent, shown in Southeastern class.

## CORN YIELD CONTEST

In this contest yield counted 70 points, corn at the annual show 5 points, economy of production 20 points and the report 5 points. The score was:

The following were prize winners in the Corn Contest: 1st, Samuel Faust, Obelisk; 2nd, C. W. Mohler, Myerstown; 3rd, G. Martin Cloud, Kennett Square; 4th, John M. H. Wise, New Bloomfield; 5th, Lewis P. Satterthwaite & Bro., Fallsington; 6th, G. A. Trimmer, Mechanicsburg; 7th, Peter Cruise, Rushland.

**Relative Rank on Basis of 100 for Best or for Perfect**

| | No. | Yield per acre, lbs. | Yield 70% | Corn 5% | Economy of Production 20%. | Report 5% | Av. Relative Rank per ct. |
|---|---|---|---|---|---|---|---|
| 1st—Samuel Faust | 20 | 10,030 | 100.0 | 90 | 95 | 90 | 98.0 |
| 2nd—C. W. Mohler | 31 | 7,825 | 78.0 | .. | 90 | 70 | 76.1 |
| 3rd—G. Martin Cloud | 14 | 6,570 | 65.5 | 100 | 95 | 100 | 74.8 |
| 4th—John M. H. Wise | 134 | 7,050 | 70.3 | 91 | 60 | 70 | 69.3 |
| 5th—L. P. Satterthwaite & Bro. | 133 | 5,325 | 53.1 | 93 | 80 | 70 | 61.3 |
| 6th—G. A. Trimmer | 133 | 4,230 | 42.2 | 88 | 90 | 70 | 55.4 |
| 7th—Peter Cruise | 35 | 4,088 | 40.8 | .. | 95 | 60 | 50.6 |

## PENNSYLVANIA WINS AT COLUMBUS.

Pennsylvania won the Zone Sweepstakes for Yellow Dent class in Eastern Zone, with 10 ears exhibited by Pusey Cloud, of Kennett Square, Pa. She also won Sweepstakes in same zone for best ear of dent corn, any color, with ear exhibited by Clarence Mellinger, of Ronk, Pa. By special request, a class other than white or yellow was made for the Eastern Zone and in which White Cap Yellow Dent was exhibited. Pennsylvania won Sweepstakes for Eastern Zone in this class, with 10 ears exhibited by Harry B. Herr, Lancaster, Pa. We lost to Maine on flint corn, both 10-ear and single ear exhibits, and lost to Maryland on best 10 ears White Dent by a very narrow margin.

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## JOINT MEETING OF THE
## Pennsylvania Live Stock Breeders' Association
## and
## Pennsylvania Dairy Union

### Proceedings of the Live Stock Breeders' Association.

### Thursday Afternoon, 1:30 P. M.

W. C. Norton in the Chair.

The Chairman: The meeting will please come to order.

Before we enter upon the program for the afternoon the Chair will announce the appointment of the following committees on behalf of the Live Stock Breeders' Association:

Committee on Resolutions—
- J. H. Reichert, Scranton, Pa.
- Prof. H. E. Van Norman, State College, Pa.
- T. D. Harmon, Pittsburgh, Pa.
- H. W. Comfort, Fallsington, Pa.

Committee on Nominations—
- M. N. Clark, Claridge, Pa.
- J. E. Dodge, Narberth, Pa.
- W. A. McCoy, Mercer, Pa.

Auditing Committee—
- Hon. M. P. Shoemaker, Greensburg, Pa.
- James Blair, Hartstown, Pa.

The Chairman: The first subject on the program for this afternoon is an address on "Co-operative Breeding Associations," by Mr. W. F. Raven, of East Lansing, Mich.

I now have the pleasure of introducing to you Mr. Raven.

Mr. Raven: Mr. Chairman, Ladies and Gentlemen, and Members of the Pennsylvania Live Stock Breeders' Association: The remarks I wish to make this afternoon in regard to co-operative breeding associations, I wish you all to understand that it is not the breeder of pure-bred stock that I am talking about today. We endeavor to call the sinners, not the righteous, to repentance. It is the every-day farmer and the breeder that uses scrubs and grade sires in his flocks and herds. Those are the men that I am going to speak to you about.

Mr. Raven then presented his paper as follows:

## MICHIGAN METHODS OF LIVE STOCK IMPROVEMENT BY A SYSTEM OF UP-GRADING

### By W. F. Raven, East Lansing, Mich.

Michigan occupies a unique position in the galaxy of states in regard to its live stock industry. Some interesting features are presented in a brief review of the history of the development of the live stock industry in Michigan. It has not been as rapid as in some of the states to the westward which went into the live stock business a few decades later, and which have now far outstripped us in the number of cattle. But the natural conditions, as the pioneer found them in Michigan, were not suited to the rapid development of the live stock business. He had to produce the proper conditions. The first settlers found nearly all the surface of Michigan covered with heavy timber. As in all forest regions, the forage of Michigan was scant in quantity and lacking in nutrition for live stock.

The land had to be cleared before forage and fodder crops could be produced. As in all timbered sections the settler had no desire to own more cattle than were required to supply the immediate needs of his family; he was loath to feed live stock the cereals which were produced on lands requiring so much labor in the clearing and cultivation. During the early histories of the state the energies of the farmer were diverted to other lines of work than live stock production. In general, we find the history of any new country, that far more attention is given to crop production. This has been particularly true of the Eastern and Central States, while the reverse has been true of the far West. The rich virgin soil responds freely at first, yielding prolific crops of a variety of cereals possessed of high commercial value. Finally, however, the land become less and less productive; the farmer begins to turn his attention to live stock production. Michigan reached its zenith in the production of wheat, which was the cash crop (in 1884-1885) in the southern four tiers of counties, and the yields of that cereal began to lessen the State over. A small minority of the settlers had brought with them good cattle, and from the first had kept and bred improved live stock. With wheat, the money crop, lessening in yield, the opening of the newer western lands decreased crop values. On the other hand, smuts, rusts, blights, and insect pests of various kinds began to appear, materially affecting both the quantity and quality of the crops produced. These conditions demanded the keeping of more live stock on the farms in order to enrich them and utilize to better advantage those crops low in value in the raw state, they had to be manufactured into meat, milk and wool and thus many were led into some line of animal production. I believe, at this period (1884-1885), a majority of the farmers of Michigan began growing more live stock. There were a few places in the State where a dairying had been carried on from the earliest settlement (notably in Lenawee County). The southern portion of the State had in many instances good flocks of the merino and grade merino sheep and small herds of good cattle. In the first attempts to improve the cattle nearly all were of the beef type. This continued until the low price of beef compelled other than beef sires to be used. The farmers then turned their attention to dairying and began to improve their cattle by the use of pure-bred sires on the grade beef cows (particularly grade Shorthorns). This system continued until the Spanish-American War, when beef rose in price until there was a good profit in growing it. Many that had been using dairy sires changed to beef sires and bred the progeny of the dairy sire to the beef sire. The indiscriminate admixture of the blood of the various breeds has been one of the most direct causes of the production of inferior stock. This has not been restricted to the breeds within the beef and dairy classes, but includes admixtures of the blood of the two classes. Another potent force tending toward the production of inferior cattle in Michigan is found in the too prevalent use of the grade and scrub sire and the saving of calves from bulls bred to females for no other purpose than to freshen them again. The lack of good breeding among our cattle today is not due to the lack of the introduction of god blood at an early date. Shorthorns were brought into Michigan in 1843, Galloways in 1854, Herefords in 1864, Aberdeen Angus in 1884, Holsteins and Jerseys were also introduced at comparatively early dates. The records of Michigan Fair Associations from the time of the organization of the State Fair in 1849 would seem to indicate that an unusual activity in pedigreed live stock breeding was manifested in the earlier days, but this seems to have been confined to the so-called breeders.

The initial step in live stock breeding for improvement confronting us today is an exceedingly simple one; we do not need to undertake the establishment of new breeds, as there are plenty now in existence to choose from, which judiciously chosen will respond favorably to the conditions to which they are adapted. The first step in line of live stock improvement must come from the cessation of the practice of admixing of the blood of various breeds and of using grade and scrub sires.

It would seem highly desirable that some form of co-operation in breeding methods should be established by communities, such, for instance, as the joint ownership and use of males by several parties rather than one. One cannot conceive of any logical reason why several men in a community could not form a co-partnership in the ownership and use of good sires. If such a plan could be followed the good influence of superior sires would become more far-reaching and fewer males in all would be needed than in the case of individual ownership.

Dean Shaw of Michigan Agricultural College, believing that some form of co-operation in the ownership and use of pedigreed sires could be made satisfactory to the members of such an association, submitted a recommendation to the State Board of Agriculture in December, 1907, urging the necessity for immediate action on the part of the college toward the development of co-operative organizations among the breeders and farmers of the State, designed to stimulate live stock improvement. This recommendation was accepted, adopted and the Agriculture Department authorized to undertake the work. In the organization of breeders' associations in Michigan five chief aims are sought.

1. The improvement of the farmer himself, not only as a raiser of stock, but as a tiller of the soil, a business man, a citizen and a man.
2. The improvement of the flocks and herds of the State in their productivity and uniformity. Productive ability in being increased by the continued use of prepetent pure bred sires. By adopting a single breed for an entire locality, buyers are attracted and a local market created.
3. The principle and spirit of co-operation is fostered by co-operating in the purchase and use of breeding stock, the farmer learns to act in unison with his fellows and is able upon occasion to extend the same principle into other fields.
4. The farmer is trained in business organization and conduct. Rural communities are conservative, even to a fault, and agriculture is seriously crippled by the lack of business methods and business system.
5. The improvement of the grade of live stock kept renders possible the further increase of capital upon a given area, and is one more factor in increasing the possible profits from the farm. Thus far in Michigan, with two exceptions, the work has been confined to cattle and the first steps were taken among the dairymen, and it was possible to reach this class easiest through the creamery condensary and cheese factory organizations and patron lists. The attention of the stockman and farmer was directed to the plan through the co-operation of the State press and the Field Agent has been working in those districts only, in which his services were requested by the people. Before taking up the work in person in a given field copies of the following introductory letter were sent to the patrons of the creamery, condensary, cheese factory or stockman and farmers of the locality, viz:

"Dear Sir—The Agriculture Department of the Michigan Agricultural College has been authorized by the State Board of Agriculture to undertake special work in this State, endeavoring to stimulate the improvement of horses, cattle, sheep and swine. The proposed plan embodies a vigorous offer to induce farmers and stockmen to procure and use pedigreed sires rather than grades and scrubs. This plan is not only to advocate the individual ownership of good sires, as far as possible, but also to promote the establishment of associations for the joint ownership of males. It will be the duty of the Field Agent in charge to present a practical method of live stock improvement to individuals and gatherings of farmers and breeders. As far as possible he will furnish information relative to the description, characteristics and adaptability of the various breeds. He will also lend assistance personally in the organization of associations for the joint ownership of sires and the promotion of improved breeding. Through the agency of the State Live Stock Breeders' Associations, lists of breeders with pure bred bulls for sale can also be furnished. If you are personally interested in live stock improvement and are willing to assist in interesting the people of your community, the services of the Field Agent can be secured without cost to you or the people you may succeed in interesting. Details of work will be given on request.

Yours very truly,

FIELD AGENT IN CHARGE."

When requests are received, the Field Agent calls upon the individual stock owner, looks over his animals, presents the co-operative plan of breeding to each man personally and secures data relative to the following direct questions, viz: (1) How many cows do you own? (2) What breed or combination of breeds are they? (3) What were they bred to last year? (4) If you were to conclude to breed them to pure-bred sires continuously, which breed would you prefer? Where the owners of eighty or more cows have signified a preference for some breed the Field Agent then endeavors to induce the owners of forty or more cows to adopt the same breed, thus securing sufficient for an association of three groups. The individuals are then invited to meet at some suitable place to discuss the proposition from every viewpoint.

When the owners of one hundred and twenty common cows decide upon some particular breed from which to select males for improvement, then an association may be formed. This particular form of organization containing one hundred and twenty cows is divided into three groups of forty cows each, with one bull for each group. There may be from two or three to seven or eight men in each group, depending upon the size of the herds, or there may be more groups in the association depending upon the willingness of the people of the community.

Each member joining an association is required to sign the following agreement, viz:

"We, the undersigned, desiring to organize a bull association do hereby promise to pay equal sums of money on or before ............., for which we agree to take equal shares of stock in the aforesaid association when organized. This association is organized for the purchase of three or more registered ........... bulls, provided three groups of forty cows each can be secured. The understanding is that these bulls are to be owned in common and changed from group to group every two years, thus providing service for six years. In case of the three group association at the end of two years to avoid in-and-in breeding, the bulls are changed from one group to another and the same thing is done at the end of four years. In this way, barring accident, or loss of bulls by death, the association is provided with registered males for a period of six years at an initial cost of from $10.00 to $40.00 per member. The owner within each forty cow group should be somewhat closely located, but this is not true of the groups, which may be several or more miles apart, their only concern being an occasional business meeting and the exchange of sires every two years.

This plan has been put in operation in over thirty places in Michigan and is working successfully for the improvement of Michigan live stock. Under this plan there was this year between six and seven thousand common and grade cows bred to pure bred sires. This plan has many things to recommend it to the farmer who wishes to improve his live stock; (1) the low initial cost; (2) the advantage of always having a pure-bred sire available for service; (3) the use of mature sires; (4) associations will buy better sires than the average individual; (5) when whole communities are interested in one line of breeding it makes a market for their surplus cattle, because they are grown in sufficient quantities to attract buyers.

In conclusion, gentlemen, the work done in Michigan has not been done in the thickly populated places in the southern part of the State. Most of the work has been in the sparsely settled sections, among the stump lands just as the lumbermen left them, as the settler is making his home. Some of you perhaps know that in Michigan we have several hundred thousand acres of good hardwood land, and the settlers from Pennsylvania, Ohio, Illinois and Indiana are coming to these places and making homes there, and it is among these people that that work or most of it is being done.

I thank you. (Applause.)

The Chairman: Now, Mr. Raven is here and ready and willing to answer any questions that you may ask in regard to this matter. We want you to fire the questions into him. This is the most interesting part of the question. It is your opportunity to bring out the things you wish to know.

Mr. Harmon: How would you go about it in a thickly setled community where there is an old-established breed and that prejudice to be overcome?

Mr. Raven: That is one of the worst troubles we have to overcome—breed prejudice. I have now on my list twelve or fourteen associations where they are already to organize could they agree on the breed of cattle, and it is necessary for us to hold meetings—sometimes I have held four to five meetings to try to overcome breed prejudice and educate them to a solution corresponding to surrounding conditions. Greater advancement has been made in our country where they have no breed prejudice. But we are overcoming that. For instance, we have an old Van Buren County organization in the breeders' association; we also have a Holstein association that takes in Lenawee county; we have an island in the Detroit River, Grosse Ile, that every man on the island except one breeds Guernseys. We try to educate to overcome this breed prejudice. I want to go at them this way: "Gentlemen, don't you think it would be right and proper and a money maker to breed Jersey cattle at this point? If this man can make money the whole of you can make money. Howell is one place in America where more Holstein breeders get their mail than any other place. Twenty-five or six receive mail at Howell. It is said that more breeders of Holstein cattle receive mail at Howell than any other postoffice in the United States.

A Member: Who selects the sires?

Mr. Raven: All of these associations are incorporated for a period of thirty years. It is not a one-day affair or a one-year affair, and the men that go into these associations intend to breed one kind of cattle continuously, so each association is governed by a board of five directors who do all the business. In some of these associations the college has to assist them in the selection of sires, and in most places we get some young men that know nothing about cattle and somebody has got to be educated along breeding lines and these are the men we attempt to educate. We say, go out and buy the sires, get the best information you can and use your own judgment. We try not to interfere with the business proceedings in any way, shape or manner. They have the right to buy whatever sires they want; they can pay whatever price they want. Sometimes it is a good thing to have them buy poor sires first and then they know where they lost out and are more careful. Each association selects its sires, buying where they like. We furnish them with a list of all the breeders of the State breeding that kind of cattle.

A Member: What kind of cattle do they breed the most of?

Mr. Raven: The three dairy breeds today stand almost even. Some months one breed is ahead and sometimes the other. Out of the thirty-two associations organized there are but two of the beef type. The Holsteins, Guernseys and Jerseys stand about even. I think at the present time the Holsteins stand ahead, but otherwise they are about even.

A Member: What do they pay for the bulls?

Mr. Raven: Various prices; all the way from $75.00 to $200.00.

A Member: Have you noticed any tendency to buy better bulls since the organization?

Mr. Raven: Yes; associations buy better bulls. While my work is along association lines, I have placed more bulls outside of associations than inside of the associations, because a great many men refuse to join associations and will breed all the same. At one place I organized a Guernsey association and placed five bulls in the association. There were seven bulls bought by individuals outside, so I had two more to my credit outside the association than inside.

Mr. Harmon: What about the productiveness? What have you noticed in regard to the increase in products, the marketable products, since the organization of these breeding associations?

Mr. Raven: We have hardly got to that point yet.

Mr. Weld: Do you make any attempt in your associations to get the numbers and keep records of the productions of the females?

Mr. Raven: Yes, in all cases.

Mr. Weld: Is that part of the association work?

Mr. Raven: That is part of the business; and right following this I want to say to you that the cow-testing association follows the breeders' association. Right along comes the cow-testing associations.

A Member: Who keeps these bulls?

Mr. Raven: I expected that question. In every association group there is one man centrally located as to his particular group that keeps the bull for hire. There is a service fee for each member; that goes to paying for the keep of this sire. For instance, it costs $40 to keep the bull a year; each of the forty members in group pays one dollar service fee towards the keep of the sire and he pays that to the caretaker of the sire when the service is had. The caretaker furnishes the secretary with the name and the date and the number of the cow bred. That is part of the record.

The Chairman: Gentlemen, have you any more questions? We want to keep Mr. Raven busy. We don't like a dead one. We want you to be alive and up-to-date. We want to move along. Ask him any questions you see fit and don't be bashful. This is a subject that ought to interest all of us engaged in the live stock industry.

Mr. Weld: Do you succeed in getting the members of the association to take hold of the work of record keeping or weighing and testing of the individual cows in their several herds or is that done by the association?

Mr. Raven: That is done by the cow-testing associations.

Mr. Weld: Altogether?

Mr. Raven: Yes. We have two associations; one the cow-testing association and the other the community breeding association. In all cases it takes more cows to form a cow-testing association than a community breeding association, and in all cases where there is a cow-testing association in a district in which a breeders' association is located the larger part of the members of the breeders' association will become members of the cow-testing association. They keep their records more easily. It takes twenty-six herds of cows, no matter what number, to organize a cow-testing association, so that the tester can visit each herd once a month. In some associations, especially the Freeman in Wago County, our breeders' association and the cow-testing association are one and the same thing; every member of one is a member of the other; but in other places it is not so.

A Member: How do you avoid spreading disease by breeding to the same sire?

Mr. Raven: By a rule in the by-laws that any member that has a female affected by contagious disease is barred from the use of the sire until thoroughly free from the disease, and he must file a certificate with the caretaker.

A Member: Do you have to be a member of this association to have the good of service in that bull?

Mr. Raven: No, sir; you do not; but if you are not you have to pay two or three times the fee for service above the others.

A Member: Wouldn't that be a good way to get these outside people interested in these breeding associations?

Mr. Raven: Yes, it would. The difficulty we find in Michigan—it may not be in Pennsylvania—but in Wisconsin, Minnesota and Michigan and North Ohio—that is, whenever a man is progressive in introducing a pure-bred sire his neighbors will not use it; if they do use it they refuse to pay a service fee equivalent to cost and he gets tired of the business. Just as sure as fate the next pure-bred sire brought into that neighborhood is one of a different breed. If I introduce a Shorthorn my neighbors will introduce a Holstein or some other breed. In these associations wherever they do not have cows sufficient for the bull they will allow outside persons to buy his services, although they have to pay two or three times the cost to the members of the association; but it is a good way to get the improvement of stock. And I find this, in our oldest association at Blissville that was organized four years ago in March, I find in that community that nearly all of the people, with two or three exceptions, are breeding Guernsey catle. I think in a few years Blissville, Mich., will be as noted for Guernseys as Howell, Mich., is for Holsteins, simply because they show the facts to me. They have been breeding upon the common stock and the farmers have got down to buying pure-bred Guernsey sires and in many instances pure-bred females of the Guernsey breed.

We do more than that. We keep a record in the Department of Agriculture at college of every member's herd, of the officers of the association, and some member from the Department of Agriculture visits each of these associations once a year at their annual meeting; sometimes the president of the colloge; sometimes the secretary of the colelge; but more often those directly engaged in the work, the head of the Dairy Department or Dean of the Agricultural College, some member of the faculty visits these associations and hears the plans and methods they are using for improvement of live stock, and we keep a record of these things. (Applause.)

The Chairman: I notice we have with us Mr. John D. Nichols, of Cleveland, Ohio, president of the National Dairy Association, and we would be very glad to have him come forward and give us a little talk.

Ladies and gentlemen, I have the pleasure of introducing to you Mr. Nichols, president of the National Dairy Association.

Mr. Nichols: Mr. Chairman, Ladies and Gentlemen: I fail to understand why your chairman should have butted in on the discussion that was going on, as I assure you much more good could be gotten out of the discussion than you can get out of anything I may say to you.

I have been very much interested in the address and discussion following, and I can only voice the sentiments of the gentleman, that a breeding association is very valuable to all parties concerned. It is valuable to the members of the association; it is valuable to the community living around where the association exists; and it is valuable to the fellow who is looking around for a particular kind of stock that association is breeding. If you don't believe that, you start out and try to buy three, four or five carloads of cows of one particular form and have to drive from pillar to post, from Dan to Bersheba to find the stock you want. You have to go through sections of the country which it has been my fortune to visit and you find two or three Jersey herds and two or three Guernsey herds and two or three Holstein herds and you will find two or three Ayershire herds; and you have to drive all around to buy a carload of one particular breed.

Another thing. There has been much said about the sire. I believe that the greatest mistake made by the breeders of dairy cattle in this country today is in the selection of the sire that heads the herd. It has been said that the sire is half the herd. Sometimes I think it is about nine-eighths, especially if you are going to raise them. I have a friend back home who was talking to me some years ago—one of the largest dairymen in northwestern Ohio. He said: "I want to show you a couple heifers I got"; and he took me to the stable and showed me two females four years of age, sired by a good sire at a cost of $4.50 fee for each animal, and the rest of the herd were bred to a sire at acost of 50 cents, and the result was that he would not have to talk long to get $125 apiece for those bred by the good sire and those bred at a cost of 50 cents each he would have to talk an ear off to get $6 for. Now, that shows that that original investment was pretty well made.

The cow-testing association has done wonders and I believe it is going to continue until it will revolutionize to a large degree the dairy business. I am a member of a cow-testing association, while my herd is so far away from the home of the association that I have no benefit in a general way. They have demonstrated with a cow-testing association of twenty-six members that one of the members can produce milk with his herd at a cost of sixty-seven cents per hundred pounds and has now got these figures—I should not quote them because I think he has got about $2.42 from his herd for each dollar's worth of feed consumed; and the poorest dairy in the herd has paid the owner about eighty-six or seven cents for each dollar's worth of food consumed. One of these fellows has realized that he has a good herd and the other fellow has realized that the herd has got him. And those things happen wherever there is a cow-testing association.

I had the pleasure last winter of visiting a large part of the dairy section of Vermont and in every particular county there every little while, as I was looking for Jersey cows, having some Jerseys, every little while someone would say to me: "Have you seen Deacon Harvey's herd?" "No, I have not got there yet." "Well, he has got the best herd in this country." And in a little while some other fellow would say: "Have you seen Deacon Harvey's herd?" And I would say, "No, I have not yet." "Well, he has the best cows ever in this country." After awhile I learned I was a couple of miles from Deacon Harvey's. So I went up to Deacon Harvey's and out from the house came a nice, genteel-looking old Vermont Yankee—you see, he didn't look like us Pennsylvania Dutch. And I said: "Mr. Harvey, I heard much of your herd of cattle and if you don't charge too much I would like to see them." He said: "If you don't get too close it won't cost you anything." I went over to the barn and he had a large herd, in the neighborhood of 50 head, of the most beautiful, uniform type of dairy cattle it was my pleasure to see in the State of Vermont. And I looked them over very carefully and I said: "Uncle Harvey, what would you pay for cows like these?" He said: "It would not be right to price them. I would not care to price them. It would not be right." I said, "It is a good time to sell when you have a buyer. What would you ask me to pick out a few and let me depend upon my own judgment? I may get the poorest ones as well as some of the good ones." He said: "Well, I need a little money, and if you mind to pay $60 a head you may pick out a few." So I picked out three and I went up to open the stanchionto let the fourth out and he said: "Hold on, Mister, I won't sell another one." Well, I argued with the old gentleman, but could not get any more. When I drew him my check for those three cows he saw my name on the check and he said: "Are you the president of the National Dairy Association?" I said: "Yes, sir; I have that honor." He said: "Well, you must know Governor Heard." I said: "I certainly do. I am glad to say that Governor Heard is on my list of most intimate friends." "Well," he says, "when you see the other gentleman give him my regards. When you first came here you told me that that was the best of dairy cows you had seen in Vermont and he is to blame for it. You told me that this stable was one of the good old stables and he is to blame for it. Twenty-eight years ago Governor Hoard stayed over night with me here and he took a pencil and he drew out a plan of a dairy barn and this was the plan. And he told me to always use a pure-bred sire and I have always done it." Now, what was the result? There was not an animal in that man's stable but what any buyer of cows would have been glad to have bought at his price, not your own; and still you find today hundreds of dairy farmers throughout this land of ours using inferior sires upon their herds, and it is the greatest mistake the breeder of dairy cattle or any other kind of stock a man can make.

Going back to Governor Hoard just a moment: I trust that everyone here is a reader of "Hoard's Dairyman." I doubt if there is an article or an issue of "Hoard's Dairyman" but what if the dairy people of this country would read and properly they would find some section in that publication that would contain all-sufficient knowledge to pay them to their entire year's subscription; and I am not selling "Hoard's Dairyman," and have no stock in the publishing company. That comes from the heart. At the last meeting of the National Dairy Show when I first met Governor Hoard there I shook hands with the old gentleman and I said: "Governor Hoard, how well you look and how glad I am to see you." That old gentleman put his hand on my shoulder and says: "My son, these remarks are very kind in you, but they are very untrue because I am going to that Great Beyond from whence no traveler returns." And I want to say, Mr. Chairman, that when Governor Hoard passes to the Great Beyond the dairy industry of this country loses the best friend it ever had, and I doubt if it will ever get one as good. (Applause.)

In the course of my talk with the Governor, I said: "Governor, did you ever meet an old gentleman by the name of Harvey?" "Yes," he says; "Deacon Harvey, way over in Westminster Valley, Vermont. Some twenty-six or twenty-seven years ago I spent a night with that good old Yankee friend of mine." Now, folks, if it had been your Chairman or I that had met Deacon Harvey we would have said: "I don't remember." He remembered twenty-eight years ago.

Now, Mr. Chairman, I got to leave you at three o'clock, and I think I better go down and pay my hotel bill; but I want to say to you and your association that I have enjoyed my visit here very much, and I am very much pleased at your meeting, at your attendance here. There is only one thing wrong with all dairy meetings. The fellow that you want isn't here. The fellow that you want is home, back down in his narrow confines, and he says: "Them fellows down to Harrisburg think themselves pretty smart." That is the trouble. (Applause.) And he is the fellow that ultimately will be driven out of all business. There is no business on earth that will stand the losses and the slip-shod methods that the dairy interest of this country is standing today, and there is not a branch of industry that is making more money than dairying along twentieth century lines with a good herd of cattle and watching the business.

Now, I hope, Mr. Chairman, to meet you and your officers and every member of your association at the next meeting of the National Dairy Show. I don't know whether Mr. Van Norman has sneaked out of the room or not. It is kind of funny to me that a Pennsylvania grass widow or young woman of some sort has not got Van. Now, Van is not a bad fellow. I think he has gone out of the hall. I wish he had not. I never like to say anything behind a man's back. I don't dare to.

I want to talk about the fellows we want and are not here. How can we get them here? I don't like to tell stories in a meeting of this kind, but a fellow once said to me, how are we going to change the methods of these old men, these dyed-in-the-wool and burnt-red fellows; how are you going to get to them to do it? I said, there is only one way, and that is like the Irishman who was about to die and sent for a priest to come and pray for him, and after the priest had prayed with him for awhile he said: "Now, Pat, is there anything further you want? If you have any sins you need forgiven, you better be thinking about it, because you have but a few minutes to remain." "Well," says Pat, "there is something I'd like to speak about, but not unless you know that I am going to die pretty quick." The priest said: "You have only a few moments and if you have any sins to be forgiven you better speak about them now." "Well," said Pat, "I wanted to convert a Jew." "Well," the priest said, "it is no sin to convert a man and if you converted a Jew it it an honor and a credit instead of a disgrace and a sin." Pat said, "Wait a minute, Father. I used to run a ferry boat, and one day I was rowing a Jew across and he fell into the water and I raised him up and I said, 'Do you believe in the Holy Catholic Church,' and he said, 'No, sir'; and I shoved him down again; and in a minute or two I raised him up and I said, 'Do you believe in the Holy Catholic Church?' and he says 'No,' and I shoved him down again; and I raised him again and I said 'Do you believe in the Holy Catholic Church?' and he says, 'Yes, sir,' but I could not believe him and I shoved him down." You ask how are you going to get the fellow here you want? The Lord knows; I don't. But I like to see a meeting of the dairy farmers of this State and to have them talk about legislation. I believe it is part of the duty of the State to have inspection of milk and if that inspection could be made by inspectors who had knowledge of the business sufficient to entitle them to that title of inspector, the cloesr the inspection could be done the better and that would force the little fellow out. I wish I had the time to spend; I would tire you out. I have seen all sides of the milk problem. The producers of milk as a rule do not realize how important their work is. If they did they would make their dairies better. They don't realize that 65 per cent. of the babies born in this land are raised upon the milk from the dairy cows, the foster mothers of the nation. And now, Mr. Chairman, it is a terrible thing to say, but it is true and I hope there is none in the hearing of my voice, but I know there are thousands of dairymen that are milking from diseased cows and putting it into the cans and shipping it to the city to be consumed by those sick and dying children. I know that is true in Ohio and I know Ohio is not so much worse than Pennsylvania. I wish that the time would come when we would have all such people driven out of business and then the fellow who makes good milk will get compensated, and not until then. (Applause.)

The Chairman: The next item on the program is the Meat Demonstration by H. W. Norton, of Howell, Mich.

Ladies and gentlemen, I have the pleasure of introducing to you Mr. H. W. Norton, of Howell, Mich., who will give a demonstration in cutting up the carcasses of these prize steers.

## MEAT DEMONSTRATION

### By H. W. Norton, Howell, Mich.

Ladies and Gentlemen: The question of quality of meats is one that has not been considered and understood to any great extent until recently. A few years ago there was not much attention paid to that subject and meat was taken in the carcass and sold strictly on the weight basis without any consideration particularly to the fineness of the quality as indicated by the different points which we consider, and it is not until very recent years that any particular attention has been paid to this subject. The addition of the dressed carcass competition class at the International Live Stock Exposition in Chicago has done more to excite interest in the question of quality in meats than anything else; and at the present time every year we have in the Chicago stock show a dressed carcass competition in which the stock is judged on foot and slaughtered and judged on the clean carcass. The judging on foot does not always agree with the judging of the clean carcass, which shows that the science of judging beef cattle is not an exact science. At the present time it is not quite so thoroughly understood as it will be after a few years when more attention has been paid to it and we have more slaughtering tests and more work done. These two cattle that were used by Prof. Cochel yesterday afternoon over at the Market in the live stock demonstration will be shown here this afternoon in the cuts, showing you the difference in the two carcasses after they are cut up over the block. In preparing these two carcasses I have had the side of each one cut into the wholesale cuts and these will serve to show you the difference in the development of the cuts, the difference in the size and thickness of the flesh, the grain, the fat, color and different points taken into consideration in judging the carcass. It might be well at this point to take a few moments to consider the judging of carcasses. In the first place, for a carcass to be prime, to be selected as a prime carcass or credited as a prime carcass, it is necessary to have a high dressing per cent. The reason for that is that the dressing per cent. depends largely on the condition of the animal, the meat, the fat the animal carries. The fatter the animal, generally speaking, the higher the dressing per cent. This is the most important point in controlling the dressing per cent. Aside from the amount of fat that the animal carries we have also the breed. Steers of the beef breeds will dress a higher per cent. than steers of the dairy breeds. This is true because the beef breeds have been bred for a great many years for the thick, heavy carcass. The dairy cow has been bred for capacity to milk, for refinement in form, for the incurving thighs, the curved ribs and low hind quarter, etc. If you are looking for dairy cows and find one that is fat and meaty you discard her, saying she puts her feed on the back instead of in the belly; and along that line steers from the dairy breeds will not dress as high a per cent. because not so thick and meaty. There is more waste in the internal organs. The digestive capacity has been developed to increase the milking capacity in the dairy cow and the steers take the same course in their development, and so the steers of the dairy breeds will not dress as high a per cent. Another fact which has to do with the dressing per cent. is individuality. There is a difference in steers of the same breed which we can only account for by individuality. In the slaughter tests in the Michigan Agricultural College along the line of determining the dressing per cent. of cattle of different market grades and to illustrate the difference which you find in cattle of different grades, we took steers of the five market grades as you will find them quoted in the different live stock dailies and the daily papers, prime, choice, good, medium and common steers. There were slaughter records kept and they showed that prime steers dressed on an average of 63 per cent.; the choice steers, 61.9 per cent, about 62 per cent.; the good steer 60.7 per cent.; the medium steer about 58 per cent., and the common steer 56 per cent. These figures, of course, would vary a little. These figures are not necessarily the figures that would be shown for averages of cattle of these grades, but they grade down very nicely from the best market grades to the poorest. The breeds will also show some variation. Figures taken from the slaughter tests that have been conducted by the different experiment stations throughout this country show that the beef breeds, for example, the Shorthorns, Herefords and Angus, in the average of all slaughter tests taken showed a dressing per cent. of 63 per cent., 64 per cent. and 65 per cent.; while the dairy breeds as compared dressed 60 per cent. to 62 per cent., a difference of some 3 to 5 per cent., and with a much wider variation, but these are average percentages. There is also a difference in the dressing per cent. of heifers and cows as compared to steers. Steers will dress a higher per cent. than cows or heifers. That fact is one of the reasons for the difference in the prices paid for steers over heifers in practically the same condition in the market. The buyers always prefer the steers when they can get them and largely because they will dress a better per cent. When we come to judge the carcass the high dressing per cent. is important because it indicates that the steer it fat; it indicates a finished condition, or a fat, finished condition.

To take up the points of judging carcases, or meat in detail as they would be followed through, if you were watching a judge in a carcass contest, the first would be the sides that were hung in the coolers and the judge would examine them, having his figures to show the dressing per cent; having looked them over he would examine the sides for the general conformation or shape. The shape that is desirable is a very compact, very think fleshed, solid, blocky form; just the same practically as you like in the live animal in judging fat steers or cattle. In comparing the sides we like to find the hind quarters or the round very full, thick and short. Now, if I had a rack so that these quarters could have been hung up before you it would be possible to show something about the difference in conformation, the difference in shape of these sides, but not having any place to hang them up it is impossible to do that, but perhaps I can show you on the cuts when we come to the cuts. The round should be very full, the thigh full and fleshy. If you compare heifers with steers, in the round the steed always shows fleshier and more compact round, while the heifer's is inclined to be thin and incurving. The round should be fleshy down onto the hock. The meat should run down to the hock so that the shank is very short, so that there is very little shank not covered with meat. The loin should be full and smooth, showing no depression on either side of the back-bone, but rather filled out full and round, showing that the carcass should have on bunches of flesh, plenty of loin meat and make a nice thick loin cut when you come to cut up for steaks. The ribs should show some conformation, well sprung from the back, not a sloping side or flat and not sprung out too full, so that we have flesh over the ribs. We want them well arched out from the back so that you find a good "eye," a good large amount of loin when you come to rip them down. This is what the butcher calls the "eye" of the beef. When you come to rip the side, rip them down, cut off the fore-quarter from the hind quarter, you expose this muscle. That is called the "eye." And as the carcass hangs from the side we like to find the flesh and thick on the hip and not sloping off, so that they will show a thick, full muscle. Of course, the thickness there is sometimes deceiving, and while the carcass may look good in the side when you come to cut they may not be as thick as you expected and the knife is the only safe index to follow. You may be easily deceived by external appearance.

The shape of the front quarter is important. The butcher likes to have the chuck well developed, thick, not heavy and showing too much weight in the front quarter, but should be thick and compact. The neck should be short, as little neck as possible, and on prime steers there should be practically no neck. This is an inferior cut and the butcher does not care about much of that. The less neck the better.

The next point after considering the form or shape of the carcass would be to consider the covering of fat. Now, for finished beef to have the prime quality it is necessary to have a very good covering of fat all over the body and completely covering it. The covering as shown on this best steer, when you come to look at these cuts I will show you there is quite a difference in the extent of the covering, the completeness of the covering of fat. A good layer of fat all over the body, as complete a covering as possible, is desirable in order for meat to hang in the coolers and ripen, in fact, it is necessary. A high-class trade desires meat that is left to hang in the coolers to ripen, and for meat to be properly ripened in the coolers this complete covering of fat is necessary. Poor cattue, where that covering is lacking, will not hang in the coolers and stay in good shape. They become soft and silmy and you cannot hang them any length of time before they spoil; but cattle well covered could hang in the cooler for any reasonable length of time and still be all right, and the ripening would increase and improve the quality, instead of making it poor, as it would with poor cattle. The covering of fat should be complete, extending over and covering all parts. Coming down on the round as the sides hang up the round should be well covered. It should be covered last; or, if covered up on the round the rest will be covered. The color of the fat is an important point. The color should be white, the whiter the better, and white rather than yellow. The white fat is considered as an indication of young beef, while if the fat is very yellow it indicates age. This is not necessarily always true. Cattle from some of the dairy breeds, as Jerseys and Guernseys, will kill yellow even at two years, especially the Guernsey's coating. They show a very rich orange-colored skin, and that color seems to sift through the fat, and two-year-old Guernsey steers will dress yellow and will sell as cow beef. The color is not necessarily controlled by the breed. Lots of cattle of the beef breeds will sometimes dress yellow. It is due a great deal to individuality. You cannot tell until the steer comes out of the cooler whether he is going to dress nice and white or not. The fat covering should be complete but not too great. Generally there is no trouble with cattle too fat. The kind of stuff that comes on the market in the smaller cities is usually unfinished rather than overdone; while in the big markets we come across cattle too fat, great soft or large bunches of tallow over the ribs, round, tail, head and rump, and that would be objectionable. But generally speaking, in order to get high-class beef and sufficient finish to make it we must have some waste fat or tallow. There must be some trimming, and when we come to cut us these big steers there will be some considerable trimming on some parts; but in order to get the best grades of beef some trimming is necessary.

The coloring of the lean also, when you come to rip them they should show a bright rich red color rather than a dark color. A very dark color is undesirable. Poor cattle without much fat and old cattle generally dress dark, but good prime beef should show a nice bright red color, not perhaps too red to be fiery, but a nice rich red color.

Those are the points you take into consideration principally in studying quality in beef: the dressing per cent; the general shape of the body; compact, well filled, thick round, thick loin, and well shaped on the ribs; good thick, compact chuck, but not over-developed in the front quarter; and short light shanks. The smaller the bones, as indicated by the shank, the better from the butcher's standpoint. There will be less bone trimming and when you buy a piece of meat you get more meat and less bone in the cut, or a greater proportion of meat to the bone.

The graining of the meat and fat, that should be very firm and fine grained, not too coarse, not soft; it should be very firm. We have to make some allowance for these cattle because they were only killed yesterday at 1 o'clock, and have not had sufficient time in the coolers to harden down. They ought to be left in the coolers for at least twenty-four hours more; a little more than that would have been better. They have been cooled out very well considering the length of time they had. The big steer is pretty well cooled down for a heavy carcass of this sort, which was only in the coolers for twenty-four hours. The fat should be very firm and the hardening of the fat is what gives firmness to the carcass. You take a side of beef from a poor steer where there is no fat and it is impossible to harden it except by freezing. Cooling them down does not give them that firm, solid condition that we look for in good beef. The muscles slip back and forth and are soft and slimy and you cannot harden them. The mixture of the fat through the elan also is important. For proper finish we like to find the fat well mixed through the lean, a good mixture of fat; but this does not mean fat in there in bunches, the way it would be more apt to be in the dairy breeds if put in here, but marbled through, as the butchers term it, or mixed through in small particles, splashes of fat mixed in through or flaked in; and a proper marbling mixture of the fat through the lean is necessary for finished beef.

Now, I will try to get more of these cuts in shape so that you have a chance to look at them and see just how they show up. Now, in comparing these two rib cuts from the two steers, these two cuts made in the same place show you quite a fine comparison of the two. The larger rib cut there is from the big steer, the white-faced steer, as they stood before you in the ring yesterday, and comparing these two you can see a marked difference in the amount of fat covering around the surface of the lean meat there. This one here has avery small covering and the lean through the eye—this round muscle is the eye—is not nearly so thick on the rib and has not so much fat mixed through the lean, and the eye here, while a well-developed eye and good piece of lean meat, is not so nicely marbled and finished, not showing the mixture of fat through the lean that the other one shows. Now, this cut here is finished very nicely. There is a nice mixture of fat through the elan, marbling through the lean, and we have a good layer of fat over the surface. That is just a little bit more fat on there than desirable in most markets. For high-class trade such a cut in large cities like New York and Chicago, this one here would be exactly what they look for and the butcher and retailer could handle this to a very good advantage. For the ordinary retailer though, one which has not quite so much fat, more like this one here, would meet the demands of a great many. The most of the retail dealers in the small towns where there is not a high-class special trade would not like that. Of course, this one here is without doubt the best cut, has the best flesh, the best quality of the two, but the retailer could not afford to handle this one in a great many cases because he could not get the price for it as he would have to trim off and he would not be catering to a high-class trade enough to afford to trim off this one. A mixture of fat through the lean shows that it is finished. In finishing cattle the priming up is to improve the quality of the meat, not to increase the size of the animal or weigh so much as the quality. The weight is produced in growing and quality improved by finishing. The feeder generally grows the animal and another man very often buys them up as feeders and finishes them, and the work he carries out is to improve the quality. A mixture of fat through the lean improves the quality of the meat by making it tender and more juicy and incerases what the chemist calls soluble extracts which gives it better flavor, and tenderness and juicyness and flavor are all important in finishing, and these are the points which govern quality in judging cuts. That is the prime object in improving quality. In comparing these two you have a nicer color in the top one, the fat is very white, the lean is a nice red color and there is a very complete covering and nice mixture of fat through the lean; while this one has yellower fat, a thin covering, is not so nicely colored, a little bit dark or dark spots through that and the quality would not be as good. Now, in comparing these two cuts, the two loin cuts, as they are taken out, you will notice that on these two there is quite a difference showing in the size and in the shape. The cut here from the larger steer is very much thicker, fleshier and heavier, more meat in proportion to bone, very much more meat in proportion to bone, the fat is mixed through better, more fat mixed through the lean in the case of the larger one than the smaller one and there are a few bunches of fat in this cut. What we like is to have the fat mixed through the muscles, not laid between the muscles in large quantities; this is not desirable. You will notice the fat covering the surface in these cuts. We have just a nice covering here, around here; up here there is no covering at all, and if you compare these two cuts you see on the surface that the loin from the big steer is completely covered, has got a smooth even covering; while the one from the smaller steer shows dark flesh there, showing where the lean shows through the covering and practically not covered; just a little membrane, not much fat covering. You see on comparing these two chucks the difference in shape. The chuck from the big steer is fleshier and thicker chuck. When you come to cut them up, if cut up into steaks, the thickness has a great deal to do with the amount of steaks, and you get more steaks and better quality out of this kind of a chuck than you would from thin cattle, and comparing these two you see quite a difference in the thickness. This one here is round, full and thick, and this other one is flat sided and does not show the development, and the marbling you notice in the meat of the big steer it is nicely marbled, and through the fat and lean it shows the finished condition.

Well, now, I will cut up these other two quarters and cut them up in what would be the method of cutting on the Chicago retail market. The cuts that I will make will probably be different from some that you may be familiar with in this part of the country, but that will probably be brought out later on with the questions. The first cut that we make in cutting up the front quarter is to take off the shank. The shank would be cut off just a little bit below the elbow bone and running on the top line of the quarter and would be used principally for soup meat or the lean could be cut up and made into hamburger or mixed into the sausages, but is principally used for soup meat. The wholesale cuts of the shank make up about 4 per cent of the carcass, genearlly about 4 per cent in the Chicago wholesale cuts. It is difficult to handle a quarter of this size without having it on the hooks, cutting on the hooks it would be much easier to get at it, and it could be done much more rapidly. Now, the next cut after removing the shank is to take off the plate, the lower part of the ribs. We would start at this point, cutting into the pit of the shoulder, then cut between the ribs there and off across the cut made in taking off the ribs, including this back part here which is called the navel, the front part which is called the brisket and the plate altogether. This one cut makes up about 14 per cent., generally 14 per cent; of course, it will vary somewhat in the way it is cut. The plate is one of the hardest pieces to cut up right, and it is used for moking short ribs of beef. It is also used largely for making corned beef, cured and salted for corned beed. In cutting the front quarter into meat for the Jewish trade, for what they call "Kosher" trade, they would cut the first five ribs right off from the front end of the chuck, inculding the first five ribs, cutting through here down to here; that would leave these ribs here; follow along that down to here. The next cut on the front quarter is removing the prime rib including the same cut I showed you on the other side of this cut here. This is a fresh cut. It shows a little better than the one I showed you before. It shows marbling and mixture of fat and lean in this case very nicely. All the lean is mixed through well with fat, showing a nicely marbled cut. There is a little too much fat there in one or two places. That is cutting as it would be on the Chicago market, when you cut one rib on the hind quarter, and would include seven ribs coming back on the last rib as it is here. It is the eighth rib. This is the prime rib, the best rib, where you get the best rib roasts. That is where you take out the rolling and standing roasts, cutting off the rib or couple ribs there, that would be rolled up and would make a very nice rolled roast. That leaves the chuck, which is sold as a wholesale cut. The chucks as cut in this way would run 25 per cent of the carcass. The rib there, I did not think to mention that, would be about eight-tenths per cent. Generally the chuck is 26 per cent, the shank 4 and the plate 13 or 14 per cent. The chuck would be used for cutting up in cattle of this sort, back there, these ribs, and the front part used for roasts, cutting off a couple of roasts across the arm here, and a couple of these arm roasts and leaving the shoulder, it would be used for shoulder roasts and the neck used for boiling meat. You will notice I was speaking in good cattle we like to find the neck short and small, not showing any neck. If you notice the neck on that chuck you see practically no neck. The steer's head was fastened on the shoulders, the neck very short. You take a steer of poor quality, poor breed, it would show more neck than on this. The neck is only three or four inches long and it has not been trimmed. It is right next the head.

On the hind quarter we start cutting up the hind quarter into these four wholesale cuts. First you take off the flank, starting inside the round or thigh and taking off this flank or muscle. The flank will make up four to seven per cent., depending largely upon the condition of the steer. A very fat steer will cut more flank than a thin one becaues the flank is one of the places where the fat is deposited heavily. The cod fat and the fat on the flank is very thick in fat steers. The flank will run from 4 to 7 per cent on the general figure; on ordinary cattle, 4 per cent. The flank steak is cut from the inside. This muscle here is pulled right out and that is the flank steak. The rest of it is generally used by the packers to make corned beef and chopped up to make different kinds of sausage and boiling meat.

We next take out the kidney fat, or suet. This is the best grade of fat on the body. It varies largely, depending on the condition of the animal. We figure 4 per cent. It will run higher than that in very fat cattle. But cattle of poor grades when highly finished, the dairy steers or steers of inferior quality, when very fat will cut more kidney fat than well-bred steers. The dairy steers and steers of poor quality when they are fat, will put more of their fat on in places where it will be trimmed off, more in bunches, and they get very heavy kidney fat generally.

The last cut on the hind quarter to make the wholesale cuts is to take the loin from the round, and in making that cut you cut in front of the aitch bone here, removing the loin and separating the loin from the round. The loin makes up about 17 per cent of the carcass; the round about 23 per cent. The loin is the best part of the carcass, from which you get the best meat. The front end gives the porterhouse or pin-bone steak and the sirloin is cut from the back part of the loin. Cutting up the round further, the first cut would be to remove the top part here, cutting off the rump, and cutting that off you cut just below the point of the pelvis, or this aitch bone, as commonly called by the butcher; cut just below that and then remove the rump from the round. This, as it stands now, before cutting any more, is what the packers term a wholesale round. It makes up 23 per cent of the whole carcass. This top of the wholesale round is the rump, used by packers largely for corning, making corned beef, and makes a very good roast as the retailers handle it. It is largely pinned and put out as rump and makes a good roast. The rest of the round, as considered in the retail market, this portion here, is made up into round steak, cutting about one-half inch thick or three-quarters of an inch thick, or made by cutting thicker, made up into round roasts. The packers make a lot of that into smoked beef hams and dry beef. If handling one of these to make up into dried beef you will notice natural divisions between these muscles here. We cut down on this here to the muscles. You can separate and tear them right apart, getting several long strips. They are used at the lower end to cure and smoke for making dried beef. But if cutting up into retail cuts, into steaks and roasts, the lower part here would be sold for the butt roasts or boiling pieces. It is tougher, more tendons or cords. It is cut off from the bone, making a crescent shape or horseshoe shape, and used for butt roasts or boiling meat; and the rest of the shank is used for soup bone.

The Secretary: Which is the tenderest piece in the round steak?

Mr. Norton: The tender part of the round steak is the inside part here. The inside muscle of the round steak is the tenderest part.

The Secretary: The muscle part or hide?

Mr. Norton: The part on the inside of the thighs, the two thighs come here. The inside or middle part would be the tenderest part.

And the loin, in cutting up the loin you often hear the question asked about the tenderloin. The tenderloin is this muscle that lies right on the inside of the body there, between the suet or kidney fat that I have taken out, and the back bone; on the inside of the body, the tenderest muscle in the body, and for that reason is demanded and high price paid for it by a good deal of the trade. It is not so juicy and so well flavored as some of the other parts or cuts, but more tender, and that is a very important point. The best tenderloins that are put upon the market, if we start them up here, this line, it would spoil the porterhouse and spoil the tenderloin or true porterhouse. For that reason the most of the tenderloins put on the market come from what they call stripper layers, the loins of a poor class of cattle, where stripped out and disposed of to the best advantage, the cheapest part being put into canned beef. Stripper cattle furnish most of the tenderloins that go to supply the trade, as well as from the poorest grades of cattle. They also take some from the better grades that are so bruised in shipping so that the loin cannot be sold over the block. In that case the tenderloin could not be injured, being on the inside of the body, and the tenderloin would be stripped out and sold as tenderloin of the beef, and the rest of the beef, especially some of the part which would not be hurt, put on the market as muscles from cattle injured or bruised in shipping.

A Member: When we buy dried beef we buy it by two different names, the knuckle and the plate? Where does this part come from?

Mr. Norton: I don't know that I can answer that question. I am not familiar at all with the terms used in Pennsylvania.

The Member: The knuckle and plate of the dried beef?

A Member: You were dividing it up a bit ago. That is what it is.

Mr. Norton: In separating these out you separate the different muscles in the natural division and the best part is the inside and it may be the terms you speak of are applied to these different parts.

The Member: When you divide these muscles, how many pieces do you make?

Mr. Norton: One here and one there. The outside is not as tender as the inside. We split it and make two.

The Member: Do you ever cut dried beef out of the front quarters?

Mr. Norton: No, I don't know of any cut that is used. This flank steak is the best part of the loin.

Mr. Bayard: Do you people want to see this hog cut up?

The Secretary: It will take a little time, but time is nothing to the hog.

Mr. Bayard: Some of us have more time than others. One thing I don't want you to forget is that we are going to sell the corn that we have on exhibition.

A Member: Where?

Mr. Bayard: Right here. If you want to look at it just go up and look it over and come down here and bid on it. We will sell it by prizes or anyway you want to bid.

A Member: A gentleman in the rear wants to know where you will sell the apples?

Mr. Bayard: Right here after we are done with this. We cannot carry them down.

A Member: The gentleman back here wants to know whether they will be there after they are sold?

Mr. Bayard: They will. I will sell the prize-winning apples; but I want to say to you that you cannot take your corn away because it is to go to the National Corn Show, where it will win some more glory for you.

Mr. Norton: This side of pork is from one of the animals used in the judging ring yesterday. I will cut this up, showing the different cuts as we would cut it if going to cure the shoulders as pickled hams and going to cure the hams, showing the different cuts made in trimming up these shoulders and hams, making the loin to be sold out as loin from the retail shop.

First take off the shoulder, cutting as I have cut this one, back of the fourth rib. This is not necessary. If you want to make a heavy shoulder you cut farther back and for a lighter shoulder you cut only three ribs. Up at State College we have been just starting some experimental work in curing hams and shoulders and cutting them up the same, cutting them between the fourth and fifth ribs, and cutting that way you notice this shoulder would be trimmed out and the first trimming would be to take out the spare ribs, cutting close to the bone. That gives you what they call butcher's spare ribs. It is very thin spare ribs, of course, used for packing up and roasting. It is quite a choice cut but not cut heavy like what we call farmers' spare ribs. The next cut will be to cut off the shoulder butt, right across the top, about one-third the top, what the packer would call the shoulder butt. The top across the top of the shoulder blade. This would be called a shoulder butt. Trimming off the fat we would have the fat separated like this. It is called the clear plate. This plate or piece of lean taken out would be called the clear plate and that is used by the packers and cut up into chunks, put down in salted brine and shipped to foreign countries and also somewhat used in this country for certain classes of trade in the mining and lumbering districts, and it is known on the provision market as clear plate. Ordinarily the farmer would simply trim that off, of course, taking off the rest of the lean and use it for making lard. This lean portion that is left from the shoulder fat is practically all lean meat and makes a very nice roast, or if sliced across this way, crosswise, about one-half inch wide, about the thickness of pork chops, it makes a very nice steak and is called "Boston Butt" by the packers.

Now, in cutting off the ham from the middle, the point where you make that cut is dependent upon whether you want to make a heavy ham, and if you want to make an American ham we cut half way between the aitch bone and the rise in the back-bone. You notice at this point on the back-bone there is a rise; the back-bone curves up there in the pelvis, and here is the aitch bone. It is split when I opened the hog up to take out the intestines; cutting half way between, so as to make an American or short ham. If we want to cut a heavy ham, cut further up in the loin. This end will give you your ham right if trimmed up and shaped. The packers would trim that up, starting with the tail bone and striking around here and taking out the tail bone and also cutting on this side back, taking off this flank here and smooth that up, taking care not to take off too much flank because the flank will shrink in curing and if trimmed too close the flank will draw down to the flesh and will not show up as well as if trimmed long. In curing they shrink considerable. The trimmings, of course, would be used for sausage meat.

Mr. Bayard: Did anybody ask what this hog would weigh?

Mr. Norton: 450 pounds.

Mr. Bayard: Dressed?

Mr. Norton: 390 pounds, dressing about 86 per cent.

Mr. Bayard: What did the best steer weigh?

Mr. Norton: He weighed before he left home 1,500 pounds. He dressed here about 64 per cent. The little steer dressed—you fellows guess on that.

Members: 60 per cent, 58 per cent, 54 per cent, 56 per cent.

Mr. Norton: That steer will surprise everybody by dressing 60 per cent. We cannot account for it in any way except that he was a Prohibitionist and did not take a drink this morning.

Mr. Norton: Trimming off this loin, you notice how thick the fat; this furrow over the back there; this shows good form. Cut right along the back, splitting the back bone, you have a layer of fat four inches all the way along. It is a nice fine layer and very firm and hard considering the length of time it has been in the cooler. It shows good quality; and the cut made to take off the lean, you start on the ridge a couple of inches from the center of the back bone and bring the cut out at the lower end so as to leave all of the tenderloin in the loin, so as not to cut into the tenderloin, to run out at the edge of the tenderloin, the round muscle on the inside, the same as on the beef. This loin, trimming off the fat would be what the packers call a wholesale loin, after the back fat is taken off. This wholesale loin, where you get the pork chops, cutting the rib chops from the rib end, the upper end, and the loin chops from the lower end where the tenderloin muscle is lying on the inside here. The rest of it there that I trimmed off, this clear fat part, is called the fat back. It will be chunked up into pieces five or six inches square for packing up in barrels and tierces and brine and salt as fat back, clear backs. A certain class of trade will consume clear fat meat of this sort and it is used for that trade, and also a large part is used for making lard. The best quality of lard comes from the leaf. This had a very heavy leaf and that was the prime lard on the carcass, and the nextgrade of this is fat back I take off the loin. The packers in making up the best grade of lard—the best grade would be 40 per cent leaf and 60 per cent of this fat back—they don't make any pure leaf lard. Of course, the leaf forms a small proportion of the lard in the carcass and they mix that with the best lard from the back, the best grade of fat backs, to make their No. 1 kettle rendered lard. The rest of this should be cut up just as it stands into pieces five or six inches square and cured, salted and put in brine for mess pork; or the rib could be taken out the same as the spare rib, and the rest of it cut up into chunks. On the farm that heavy fat of this sort and ribs are taken out and the lean separated from the fat and the lard rendered and the lean made up into sausage. For making bacon or anything of that sort it would be out of the question. It is too heavy. According to market requirements fat bacon hogs should weigh from 160 pounds to 200 pounds, and small hogs of that size should be cut into bacon, and heavy hogs of this sort should be cut into mess pork, barrel pork and hard salt pork, as commonly called by the packers, to a large extent.

A Member: Where do you get the sausage meat from?

Mr. Norton: In cutting it up in this way the sausage trimmings would be only the trimmings taken from the shoulder in trimming that bone to make a picnic ham and the same thing in shaping that. You don't get very much sausage trimmings in cutting in this way. On the farm generally when you come to cut up heavy fat sides of this sort this would be torn up and the fat rendered into lard and the ribs taken out and the ribs used for sausage and also the top off from the shoulder, this Boston Butt, that perhaps would be made into sausage meat. That makes good roasts and steaks if sliced across.

(Applause.)

The Chairman: We will now offer for sale the corn and apples that are on exhibition upstairs.

I now have the pleasure of introducing to you Mr. E. S. Bayard, who will conduct the sale.

Mr. Bayard: Ladies and Gentlemen, I am sorry that we have to sell this corn this way. This corn has been engaged to go to the National Corn Show, at Columbus, Ohio. Any corn bought here that we want to go to Columbus we have the privilege of taking. It will be shipped to the buyer from Columbus.

One thing I am sorry to say here is that some people have so disregarded the rights of others that they have spoiled some of the exhibits that Pennsylvania desired to stake its reputation on at the National Corn Show in Columbus. Some people have shelled off some of that corn and spoiled it for the show. I wish I was big enough a man to kick anybody of that kind clean out of the community.

This corn will be sold and shipped to Columbus and shipped back to the buyer from Columbus, if we want to keep it to send to Columbus.

There is not much we want to send there, for the reason that they have only three classes for corn at the National Corn Show. While some of the corn here cannot win money at Columbus because there is no class for it, still we are going to send some out there for purely decorative purposes.

A Member: Who pays the freight?

Mr. Bayard: We pay the freight both ways.

The first prize corn was shown by Pusey Cloud, of Kennett Square, Chester county, one of the richest counties in the United States, and I hope they won't let that corn get away. Unfortunately, owing to a thief in our midst, we have only nine ears of that corn left. Some scoundrel has stolen one ear of it. If apprehended he will be arrested.

A Member: That is what we get for coming to Harirsburg.

Mr. Bayard: I have held corn shows in Pittsburgh, in Philadelphia and in Harrisburg. I have been at all of these Breeders' Association meetings and attended all the corn shows and I think the proportion of thieves is about an even thing all over the State. You Philadelphia people are not any better than the rest of them. But this is the first time we ever lost a whole ear out of a grand champion show.

The Chairman: Gentlemen, we will now adjourn until 7:30 o'clock this evening, when we will have some good lectures. Adjourned.

## THURSDAY EVENING, JANUARY 26, 1911—JOHNSTON HALL

Hon. W. C. Norton, president of the State Live Stock Breeders' Association, in the Chair.

The Chairman: The meeting will please come to order.

The first thing on the program this evening will be an address by Prof. Menges on Corn. Now, we have about an hour that we can spare to the Road question and Corn. We will divide that time up as near as possible between the road and corn questions, and then we will come to the alfalfa and following that the milk scoring will also be announced.

Prof. Menges: Mr. Chairman, I am not on that program.

The Chairman: Well, perhaps I had better explain.

Prof. Menges: I think you had better.

The Chairman: Mr. N. H. Brewer, of Hockanum, Connecticut, was on the program for this evening on the subject of "Successful Corn Growing," but he could not come and Prof. Gardner was required to be in Columbus, Ohio, tomorrow morning, so he could not stay, and therefore we have asked Prof. Menges to talk to us a few minutes on the corn question.

Prof. Menges: Mr. Chairman, I am the very man every time. I am sorry that I have to intrude myself upon you tonight, but I will promise you that unless I get very much interested and I see you are that I won't talk very long.

I have been on this corn breeding work for about eight years, and I have found out only a few things in farming, because I cannot devote all my time to it, but I have to make a living breeding corn in Pennsylvania just now. There is not enough money in it, but I believe there is enough money in it for every farmer to go into it and do it for himself; and I think I am talking to farmers who own farms and live on them, and farm them. I don't know how it would be with a fellow that rents a farm to go into anything of the sort. I do not know how it would be for the man who rents his farm to the other fellow, whether he ought to go into it. I do not know how it would be for him; but I am talking about the man that owns the farm and lives on it and works it. I believe it would be a paying business.

Another thing I have learned: I have learned that corn can be developed for any particular section of the State. You cannot go to Ohio and buy your corn, bring it here and for the first two or three years get results such as you ought to have. You cannot do it with any Western corn. I have tried that several times and I say you cannot do it, but I have found that if you get a corn that is adapted to your soil, your climatic conditions and the seasons that you have at your disposal for growing corn, when you have such a corn, that is the corn to work on, and every farmer ought to have experience enough to know when he has got that kind of corn. The first thing you want is quality. I say that is the first thing; you want to get as much corn and as good corn as you possibly can get on your farm. I said a little while ago that you can develop that is adapted to the soil and climate you have. Last summer, that is only this last year, I had an experience that convinced me more of the truth of the statement I am making now than anything that has happened. I had about two bushels of the best seed corn I believe I ever had. The man that I used to work with died last winter, and I had to get somebody else to work with me on this business, and I went to a fellow whom I knew very well. He said, we can do that work on our farm and we have better land than you have over there. That was true. It is this red soil we have in York, Lancaster, Chester and Montgomery Counties. You know what it is, Mr. Sharpless. On that kind of soil we raised the corn, and I say it was good corn. We took that seed corn and planted it on the richest soil in York County and I thought we would get a crop of corn that we could brag about for years, but we didn't for some reason or other that I cannot explain—I am not here to explain—for some reason or other that corn reverted. It went back to its great grandfather, a whole lot of it. Some of it had big cobs, but we didn't have any corn like that, not at all. Some of it was short grains; some of it was not filled out and all that kind of thing; and I cannot blame anything but the different soil condition.

A Member: You planted it in the wrong time of the moon.

Prof. Menges: No, sir, we have gotten away from the moon in York County. Some fellows had it shining around here, but that has not anything to do with our corn. I cannot explain it but that very corn on the red shale had yielded up to ninety bushels to the acre of shelled corn. Now, how did we do it? That is the thing you are interested in, I know. We started out about eight years ago with the improved Leaming corn, but I did not know very much about it then, and I do not know very much about it now. But we started out to select the stock that gave us the very best kind of an ear, and the very best kind of a stalk under normal conditions. We did not take that stalk that stood out there by itself and produced a big ear. You know when you select the large ears out of a lot of corn and don't know what stalk it came from you don't know where that stalk stood, or what kind of environment it had about it. So we want to know the environment. We want to know whether that stalk that produced the large ear did so in an environment where any other stalk had grown and produced an ear, and the stalk that produced the largest ear and the right kind of an ear, and the right stalk, and the right foliage, and the right kind of a tassel and the ear at the right height, that was the stalk on which we selected the seed corn to begin with. But I want to say to you that takes a little bit of work. Now, we have found this, that when we select seed corn from the stalks that have done well under the environment where it had to fight for everything it had gotten that you gain a strength of character behind it that you do not get when you select the seed corn right at random, right out of the pile. We have found that. Now then, after working along that line for a little while we went to corn breeding. We selected the best ears we could find, those that suited us best, and we planted those ears in the rows by themselves. Suppose we had an ear here that was just exactly what we wanted, and we took the corn from that ear and we planted it in row No. 1; and suppose we had another ear that suited us very well. We took the corn from that and we planted it in row No. 2, and the corn from another ear in row No. 3 and so on until we had twenty or thirty rows. We had that corn there pitted against itself just exactly as you dairy men do with your cows. You know what every cow is worth to you and what she produces in money for you. You can do the same thing with corn. And then we watched that corn and gave it good cultivation, the kind corn ought to have. We planted in rows three and a half feet apart, and three feet apart in the row. That is two stalks to the hill. That is thick enough planting. A lot of people plant pretty near twice as much as that; that is, twice as thick. But I want to say you are doing it at the risk of getting quantity when you plant that thick. You get nubbins when corn is planted too thick, and you do not want nubbins. That is the thing we have been fighting. We had these twenty or thirty rows of corn running parallel through the field and we could see what they would do. They were up against each other in competition. And what did we find? We found here a row that would have a lot of nubbins, by selecting the very kind of an ear you see. Then we had another row that had barren stalks in it, then we had another row—and this happened last summer—after seven years' work along this line—

then we had another row with ears away up there, six feet above the ground, entirely too high. I say this very thing happened with the ears of corn last summer in my case, after seven years' work on this line. I cannot explain it. That row of corn did not ripen out of the limits of our season. We have about one hundred and twenty days, fully one hundred and twenty days in which to ripen corn. Still you have another kind of a row. You have another one that had weak tassels, and another one that the ears are produced too low on the stalk; they ripened too early, do not take up the entire season. And so you pick out. You have here an opportunity of seeing just exactly what the results are and that will give you a pretty fair average of what you have in your entire crop, to show just exactly what these ears are capable of doing and what will be the result. Now, select the seed corn from the row that has given you the largest quantity. We ought to do that, but I do not always do it. Not always. Why not? Because some of these rows had produced a lot of nubbins, two years on the stalk and not very large ones, and I do not like that and I am growing corn. Mark this, I am trying to get a stalk of corn that will produce one large ear. Now, what do I mean by a large ear? I mean an ear that will shell about fifteen ounces of corn to the cob. About eighty-six per cent. of corn to the cob, that is the kind of an ear I want. I have not done any work along this line of raising two ears on the stalk, but want an ear of the size I have already indicated. That is the kind that suits me. Now, after you have worked for these results awhile, I have worked on this line, and you have eliminated the rows that produced nubbins and barren stalks and stalks with ears away up here and others away down here, and with weak foliage and all that kind of things, and you have selected those that are doing the very best, and that is the kind I want—let me say right here that the nubbins will disappear. I mean that little fellow about this long.

Mr. W. H. Ream, living on the same kind of soil I am talking about, this last summer in a dry season, had a crop of corn produced in the way I am trying to tell you and the shortest nubbin was that long (indicating). That is a pretty fair ear in some climates, pretty fair. The longest ears were twelve inches long, and that is the kind of ear I want, if I can possibly get it.

Now, the next thing—and, Mr. Chairman, if I talk too much tell me, because I may be getting interested. Now, the next thing I am going to talk about—and if I have not made things plain ask me questions, and if I can I will answer them. The next thing I am going to talk about is the kind of ear. What kind of ear do you want? We had some here today that suited me first class. I want an ear twelve inches long, as near as I can get it, but if I can't get a twelve-inch ear that has grains as long as a ten or eleven-inch ear has, then I will take the ten or eleven-inch ear; I want the grains on the long ear just as long as on the shorter ear. Now why? Because I always get more corn, that is why. Never sacrifice length of grain for length of ear. When you have to get an ear that has a grain only one-fourth inch long, always take the short ear that has a grain five-eighths of an inch long every time, that is my experience. And then what else? Then if I can get it—I know I am not talking scientifically when I say this—if you can get it, have the rows straight and the grains equal size, and the butts filled out and the grains running over the top filled out; I want to get just as much corn as when the rows are crooked, and I take the ear that has straight rows, provided it gives the quantity of corn, but if it don't do that, don't take it. I never do. It is quantity I am after. Take the crooked rowed ear provided it has a good body and more corn than the straight rowed one; while I say this is not scientific doctrine, and that is not corn breeders' doctrine, but that is what I do, and I am telling you what I do. That is what I know about it.

Another thing I want to talk a little bit about is what kind of a a grain you want. You want a grain five-eighths of an inch long, and about one-eighth of an inch thick, sometimes not quite that much, and it ought to be a quarter of an inch and a little more across. And then it should not be pointed like a shoe peg. Never plant shoe peg grains of corn. Now why? Because they are low in vitality. They have not a good germ. That is the trouble, and there is where the trouble is, and you want as strong a germ as you can possibly get, and you do not get it in a shoe peg grain.

Now then, after you have selected this seed corn carefully, you want to take good care of it. The best kind of care of it. Put it some place where it is dry and where the air can get at it and dry it out so that there is not sufficient moisture in it to freeze when the temperature goes to zero and below. And then after you have got on that far and you start in with corn breeding—and let me repeat again, I do not care what part of the State of Pennsylvania you live in you can develop a corn that will be suited to your climate and to your soil, and the best corn to do it with is the corn that you have now. Go out there into that field, select the kind that we have talked about, select those ears we have said you ought to select and the kind of the grain and begin breeding from them and breed up five or six years, or seven years; you will have developed a corn that will be better suited for the climate and soil conditions that you have than any corn you can get anywhere else, I don't care where you get it. I believe it is the bounden duty of the farmers of Pennsylvania to breed up along this line and do that work.

Now, my friends, I have introduced this subject, and thank you for your kind attention.

The Chairman: We have a few moments we can spare yet if there is any one that would like to ask the Professor a question.

Walter E. Seely, Luzerne County: I would like to raise a corn that has a high protein value, and I must go home from here not knowing which of these varieties is best. Would it not be possible to have a little type-written list accompany these various types that we might have the information along with the show? This has been the first corn show that it has been my privilege to visit. I have read somewhere that different varieties of corn differ in their contents. I am not saying this to criticize, because older heads have brought this meeting about than myself, men of more experience, but I am going to say I am very much disappointed in looking over the varieties of corn here that a little more of the history and analyses is not given with some of the varieties. I would like to raise a corn that is particularly rich in protein.

Prof. Menges: Mr. Chairman, might I reply to that question for a minute? It is not very difficult to determine the quality. I would not like to say composition, but the quality of corn, by the use of your pocket knife. Take your pocket knife and cut a grain parallel with the one side, lay it open and there you will see the various components that enter into the composition of a grain of corn. You have the outside hull, then you have the gluten, then you have the starch coming next to the germ, on both sides of the germ, and then you have what you call the cornstarch and the germ. When you have a grain in which that hard, horny gluten move in and nearly touches the germ and sometimes entirely touches it, you can conclude that you have a corn that is high in protein, because 85 per cent. of protein in a grain of corn is contained in that horny gluten and in the germ. Now, that is the only thing to do; don't let it be understood that my talk would lead anybody to think that it is absoluely conclusive, but it is well nigh absolutely conclusive that you have a high protein corn, when you have these conditions.

Mr. C. T. Mitchell: In regard to Prof. Menges' speech about the renter and the owners of the farm, about selecting this seed corn, it is for the benefit and a paying proposition for the renter to be very careful in his seed selection. It will pay him more to look after his seed and the selection of his seed in order to produce a better crop. Now then, in buying a seed that is not adapted to the soil. Get corn adapted to this climate, adapted to your soil. Go through your fields, select your seed corn as Prof. Menges has mentioned, get the right height of your ear, the right stalk and you can produce your ear then after you do all the selecting. In talking about the shape and characteristics of the ear: There are ears that the rows are not perfectly straight, but the ear carries its form out to the end, and carries its seed well, and Prof. Menges says that it may not be the perfect ear, but it has the vitality to it. Now then, after you get all these points in order to raise such kind of a cornstalk, you must have something back of it. You must have good soil, you must have enriched your soil. We feed quite a large bunch of stock on our farm and we try to eliminate this burning and wasting of manure which will burn white in twenty-four hours if piled up, and it is no earthly good to the soil. Is that right, Professor?

Prof. Menges: Well, I would not make it that strong. The organic matter that is contained even after the nitrogen has been burned out is of some value.

Mr. C. T. Mitchell: That is true. Now, we went and got what they called South Tennessee brown rock, sometimes known as floats. When our stables are cleaned the manure piles are leveled off and there is about six hundred pounds of this rock spread over this manure every day. That manure is left there until spring. We plow our ground for our corn, we spread this ground with this manure, which by this time is in a decomposed state. We take our disk harrow and disk this into the ground, thoroughly harrowing, and then plant our corn. At our last cultivation we put on about eight quarts of alfalfa and a little red and a little alsike clover. That gives us the nitrogen to our soil, and this rock is analyzed by the State College of Pennsylvania as giving about 28 per cent. of phosphoric acid.

The Chairman: The time has expired for this and we have got Dr. McCasky, of Lancaster County, who is Chairman of the Board of Supervisors of his township, and who shall speak to us on the road question. I have the pleasure of introducing to you ladies and gentlemen Dr. McCaskey, of Lancaster.

Dr. McCaskey: Mr. Chairman, ladies and gentlemen: When I heard that the question of roads was to brought up before this meeting I felt rather reluctant at first to come before a body such as this, and I thought possibly there might be some remarks which might be helpful because of personal acquaintanceship with this subject at first hand. You know the value of good roads; everybody knows it. We have been reading about them for many years, and we all know what it means to be able to drive over a road that is smooth, well crowned, hard and that will carry us without any difficulties during the months of spring, and we also know what it means to go over a road that is full of ruts, large, deep sink holes, and with dangerous, deep spots that you cannot sometimes get through at all. What we are particularly interested in, is how are we going to get them any better. Now, there are quite a number of ways that this matter might be considered. The other day a measure was introduced into our legislature providing for a great sum of money to be appropriated, and for quite a radical reorganization of our State Highway Department. Well, now, gentlemen, all these things are very important, and very valuable, but I don't thing we want to wait until the State is going to do all of it for us. I think we can do a great deal for ourselves, and I am going to sketch in just a few words exactly what I did, and you can draw your own conclusions as to what you can do in your own township. I live about seven miles east of Lancaster. The township is East Lampeter. I am a practicing country doctor there, and I used to have four horses and seven years ago I got an automobile, and I followed one automobile with two automobiles, and there was a road that I used three, four or five times a day, yellow, soggy clay in the spring time, and after every heavy rain. It had been neglected. There had been no attention paid to its drainage, and the first principles of road construction had been absolutely ignored, but there was the road. It had its ruts and had great, big depressions, and the water after every rain would stay in the middle of the road, and every time we had a freezing spell there it would be, and in some places that road as it would come out of the spring time weather would be at least one and a half feet deep with nothing but yellow, soggy clay. Everybody knows what that means. I used to drive this road because I had to, but I thought there was certainly some better condition we could bring about. I was paying my road taxes like anybody else, and I was paying pretty handsome taxes, and I appealed to my supervisors. I said, "Gentlemen, this road is quite heavily used and as a farmer and taxpayer of this community and taking into consideration the professional interest affected, I respectfully ask if you won't do something to help me out?" Well, they said it is just as good as before; we always fix it in the spring, and we will fix it next spring. Well, things went along and nothing was doing, and I requested these supervisors to let me take them over the road personally. I wanted them to get stuck in that rut with me and then help me dig myself out. No, they would not do that; they did not feel that it was their public duty to be particularly interested in going over the roads at bad seasons of the year, so they refused. So I got a camera and I took a number of photographs as the road was in different weeks and in different seasons, and I ran the photographs over a period of a year, and the outcome of it was that as I got interested in this road subject I heard about a split road drag invented by a man named King out in Missouri, and any old port in a storm, and so I put the drag to work and, gentlemen, that drag worked a revelation in a few hours. I could not get anybody to drive it for me; everybody was skeptical; "the drag is no good; it is a cranky contrivance, and we won't help you." That was the general sentiment of the neighborhood. So I sold all my horses and so I had nothing but my automobile, and I went out on the market and I rented my team. I said, all right, I will get teams. I paid my money and my neighbors charged me for the use of my team, the same people that used the road that I did. I put that drag to work and after a few hours I got the road smooth, and filled in the ruts, and a lot of the mud got into the larger holes and these too practically filled up, and in consequence everybody drove that road. And then they said, well, maybe there is something in that road drag. We will withhold our judgment for a little while and see what it will do further. I stuck to it and dragged the road in the following spring from the beginning of March to the beginning of May, and, gentlemen, that road was as nicely crowned as could be, the side gutters were clean and smooth and the road was firm all over, and after every rain instead of the mud being three to four inches deep, an having big side puddles and dangerous, deep holes, it was simply an inch or two and dried off in a few hours. Well, that worked a miracle. Farmers that drove that road therebefore would get stuck with coal teams and lumber teams and when they went to the railroad station with their oats, wheat and for supplies generally, and they would get stuck in the mud, and after dragging the road they didn't get stuck any more. That is what I think we all can do. If any of you men are dissatisfied with the roads any more than I was and you cannot get the local officials to fix it for you, get a drag. Get a railroad tie and hitch your team to it. You have all seen pictures of this road drag. If you have not you can readily find out by writing the public road department at Washington how to rig one up. Hitch your team to that drag and try it yourselves just once, within a few hours after a rain when the road is moist, but not too soggy, and see what it will do. You will be satisfied that it will be a good investment. Now, that is what I am getting to. The very fact that you yourself would do this sort of thing will not be looked on with favor by the men whom you have elected as your road officials. They will think it will reflect on them, and it does. It will make them sit up and try to get the road put in better shape. They will inquire about it; they will learn about their duty and, gentlemen, that is really the solution of this country road problem. We are not going to get all this State aid at once, and supposing we did get a great, large sum of money, what are you going to do with it? We have road officials. I am one of them. We do not know how to plan out all to the best advantage. The fact that we get ten or one hundred thousand dollars does not mean that we are going to get roads faster by that appropriation. Now, the fact is that the course of things is to plan how with the dollar you are going to get a dollar's worth of work. We will learn that by studying our duty, and this is really the solution of the road problem, and as you learn the supervisors will gradually take more interest in their duties. Then you get them more and more interested and as the supervisors see that you are determined that they must give a better standard of work, they will give it. People are not going to fall all over themselves to work unless you want them to. It is a good deal like calling the doctor at night when there is no money on hand for the fee. The doctor wants to be sure first he is going to get his fee. And as we hear and read so much about State aid and State appropriations for our roads, please don't forget that the State, while it will do a great deal, cannot do it all, and please don't forget that we in each of our local townships can do a great deal. If you want to mix up with the road officials if they get obstinate, mix up with them. That will not hurt. See that there is some system injected into their work. Find out if they have a map of the roads in their township. Suppose you inquired in Harrisburg if there is a map of Harrisburg and the people say, no, we don't need any. We are going to save that expense. You would not think much of the town. If upon making inquiry of your road officials you should find there is no map of the township, how are they going to do the best work when you cannot figure out where the roads are. There is a point I want to emphasize: As you men go about the township make inquiry of the road officials as to things of this sort, see if there is a map and if not, see that they get one. Where are they to get one? We have the State Highway Department at Harrisburg. You can get it. It won't cost the township one cent for it. If the road officials see you are talking of them and that if they don't move you are going to move them; they will move and you will get your roads.

Now, with the map you can begin to devise a local system whereby the roads that radiate into their central points—take in my own county where the farmers drive into the town and deliver their milk each morning, or near a railroad center where they drive for their lumber and supplies—all these sections on that map could be well drawn and the system can be devised whereby certain sections of road will be let out by contract and the man that takes a contract for the job will be held responsible for that section. The supervisors can arrange to pay him good money and you will get your roads. Now, gentlemen, these are some of the things we can do. I am not interested in this road matter any more than simply because I had to make myself interested in it for my own good. If I had not been interested in it I would have had to give up my automobiles long ago because I could not go out there.

Please don't wait until the State has to do all this, because the State cannot do it all. These are just a few points in passing, gentlemen. This subject is very big. The supervisor has a great deal of authority. He is an autocrat if he wants to be. If you are blocking up a side gutter where you want to drive in with your hay team and you are spoiling the flow of water and you are damming back the flow of water you will compel that water to flow on the road, and if the supervisor comes along and says, Mr. Jones, you want to open this ditch, and you say, well, you can't open it; this is the way it has been for a good many years and I want to use this driveway, and I don't want you to open it. What are you going to do about it? The supervisor can just do exactly as he pleases. He can open it or not open it. The nicest way would be to say, Mr. Jones, that water course must be opened; if you do not want to get a pipe and put it in there, let the township put that pipe in for you and you pay the bill for the pipe and the township pay the bill for the labor. Otherwise the township is going to open up that ditch and you won't have anything at all. What are you going to do? The man may say, I am going to sue you. If he does sue he will not get anything because the law authorizes and empowers the supervisors to open up water courses and remove any obstacles from them.

I could go on for an hour or two hours on this subject, but, Mr. Chairman, I don't want to take any more of this time.

Please don't wait for the State to do it all; the State cannot. Don't jump all over the State Highway Department because you have not got it already. Don't crawl all over the supervisor when he is disposed to do something besides promises. If you see a supervisor at work or out inspecting his roads on a bad, rainy day and seeing where to make improvements, follow him and see whether he makes them and if he does back him up and you will get roads quickly, gentlemen, with a little co-operation of that kind. If necessary, take your coat off and help and you will get roads quicker with a little co-operation like that than by criticizing and not doing anything. Now, there is an old proverb: 'It is better to be 60 per cent. right and do something than to be 100 per cent, perfect and sit on the fence and criticize." I am for the 60 per cent. man every time because he helps and where I am 40 per cent. wrong there is always somebody else can supplement my mistakes and we get our roads.

These are just a few ideas, gentlemen, and I am sure, Mr. Chairman, it has been quite a pleasure for me to address this meeting. (Applause.)

Mr. Reikert: Do you think it would be feasible to contract portions of these State roads out, having them dragged with teams by contract?

Dr. McCaskey: It is not only feasible, sir, but being done with the greatest economy and greatest of success in my township, which is divided into three divisions. Each division is put under the charge of one supervisor. I am in charge of one division. As soon as I was on the job I figured out my mileage and I put one mile under the charge of one man. I hired nine men, making contracts with them personally, gave a King drag to each man and told him what I wanted him to do and told him not to mind what his neighbor was was doing; mind his own affairs, which he does. We pay him forty cents an hour and they do the work and there is no trouble about charging overtime or undertime. They are a good bunch of men that want to do the right thing. I make it my business to make a regular inspection each week and once a month I make a report as to what each man does and if he does not do the right thing I jack him up.

A Member: How long does it take to drag a mile of road?

Dr. McCaskey: It takes about an hour. Where a road drag is started in an undragged section it will take possibly the first four or five times two hours; but after the road is started, after it gets its beginning it will take about an hour.

A Member: How often do you drag that mile of road, after every rain?

Dr. McCaskey: When the surface water that can has run off and the road has gotten the proper consistency. It is best to use the drag when the soil is moist but not sticky.

A Member: You would not advocate to put these drags on in the spring when it first thaws out?

Dr. McCaskey: No, sir.

A Member: Not as long as there is frost in the ground?

Dr. McCaskey: I would not say that on a road that had been dragged, but I would not begin until then on an undragged road. For instance, some of my roads that I have been dragging for a year or two, in the middle of the day when the frost is out of the ground for just an inch I put the drag on and that fills in the little depressions of the horses' hoofs and where the ground was soft, so that it freezes up smooth and firm and the road dries out quickly.

A Member: How about dragging a road when the snow is on the ground?

Dr. McCaskey: Any time of the year when the ground has the right consistency. Where a road has never been dragged before it won't do as much good as on a road dragged for a year.

A Member: Did I understand you to say that you used a railroad tie for a drag or a steel drag?

Dr. McCaskey: I just made that suggestion rather than do nothing at all; rather than not dragging your road at all you can get a better road by using a railroad tie than in doing nothing.

A Member: We have a drag at home. Do you ride this drag; stand on it?

Dr. McCaskey: Yes, sir; always stand up front.

A Member: Near the ditch end and front?

Dr. McCaskey: Yes, and then look out you don't fall off.

A Member: How many runs do you make with the drag—one or two?

Dr. McCaskey: Make three if necessary. One will usually do after you have the road started.

A Member: Where do you get your drags?

Dr. McCaskey: Make them. If you cannot make them send up to Mr. Hunter, at the State Highway Department, and he will send you a bulletin telling how to make them, or get a railroad tie and start in. It is simple, gentlemen. But the point that I want to emphasize is, don't wait for the State to do all this; the State is going to do a lot, but you can do a lot now.

Are there any more questions?

The Chairman: We will hardly have any more time to devote to this question now, although it is a question we would like to exhaust. We have two more subjects to take up tonight.

A Member: I was wondering why the gentleman speaking on the road question was so lenient with the supervisors. I happen to come from one of the most mountainous counties in Pennsylvania and we up there have gone to the expense of buying a stone crusher and a road scraper. They cost $2,500. We have several plank drags we are using and we have not got an abundance of taxes to work with. I think our valuation runs $320,000 for the township and according to the law we can lay a ten-mill tax, so you can figure out what we get. But the question is that the money we raise don't go to the right place, and we are not wholly responsible for that, and the only way we think is to have the State come to our assistance and they can do it. Those who are from Luzerne county may have noticed in the papers this last month of the way in which our road taxes goes. I was sued and had two damage suits go to the court. We have forty-seven miles of road and have a survey map and much of that road is in such a shape that the law requires a railing for inebriated men and careless drivers. We have many corporate interests in our county and there is a feeling engendered among most of the people that it is only right to get a crack at the municipality in damage suits. As a result of that, if we have a case brought up from spite work or negligence or anything we are up against it. I know of a case where a man drove off the end of a bridge because he was careless and, gentlemen, under the law he collected damages for the accident where he should have been more prudent himself. What is costs to put up these rails we could pay with the taxes if we did not have to pay out the money for these lamages and we have many miles of rails now. The law was intended for good and for the right kind of people, but was abused in Luzerne county. There is a miscarriage of justice. These costs have been put on the township and the taxes have been compelled to go in that way instead of being put on the roads to do good. In Slayman Township, across the river from me, a man, who was an Assemblyman of this State and afterwards served a term in the penitentiary for distilling illicit whiskey, owned a farm along the river, and at the heighth of the bicycle craze the bicycle club obtained permission of the township officials to build a bicycle path six feet wide on the edge of the bank. This gentleman I am speaking about owns a fine horse and instead of driving in the roadbed he would show his mean pirnciple and drive in the bicycle club roadway that they had built there and maintained at their own expense. I am getting to the point where you will take notice a bit. One day he drove too close to the edge of the bank and went down over it and then an ambulance-chasing attorney came to him and took up his case on commission, sued Slayman Township for $5,000 and got $2,500 damages that should have gone to build roads in Slayman Township. We don't want very much of that up in Luzerne Township. I believe that there should be some protection where there is ahighway placed on the road to keep that man who is prudent and stays sober from slipping off the bank, and I do not believe there is anything better or more lasting than a sloping ridge at that side of the road that will stay there and be there for twenty-five years, and have that law repealed that makes it necessary that you put up a lot of railing for fellows who are not prudent enough to keep on the road and use judgment enough to stay on the safe side of drive.

(Applause.)

The Chairman: Is Mr. M. H. McCallum in the audience?

Ladies and Gentlemen, Professor Agee was the first man on the list to speak on "Alfalfa," but he had to leave us last night and Mr. McCallum is second.

I have the pleasure of introducing to you Mr. M. H. McCallum, of Wernersville, Pa., who will talk on "Alfalfa in Pennsylvania."

## "ALFALFA IN PENNSYLVANIA."

### By M. H. McCallum, Wernersville, Pa.

Ladies and Gentlemen: The subject of "Alfalfa" is quite an interesting one to me and I have had to do with it for eight years now and dare say that the last year has been one of the most interesting years that I have had the experience of growing it, from the standpoint of value as a food. Now, the time that I am to speak to you on this subject is very short, I have been told by the chairman, and in the few minutes I have I shall try to confine myself only to a few of the most important phases of the subject. I should like to speak to you of its great value as a food for the dairy and practically all animals upon the farm, and I should like to tell you of the essentials in the growing of the crop, and I should like to speak to you of the methods of making hay; but I shall have to forget all these in order to confine myself to the limited time, and I shall speak in the few minutes that are allotted to me of alfalfa in short rotation.

I believe that the farmers are coming very fast to the time when they appreciate the requirements of a crop, that they more fully realize the likes and dislikes, and it is only when we come into this knowledge that we appreciate the value of this crop. I wish that I might be able to picture tonight in words and give expression to my enthusiasm just along this line, but this will be impossible; but I shall in a few words try to tell you of the crop in short rotation, for I thououghly believe in short rotation: First of all because of the turning down of the sod. I don't like to leave it standing longer than three years. I used to leave it stand just as long as I possibly could on account of the weeds and I have had it stand for four and five years, but I believe that the limit of time is the three years when it comes to get plowed, and it is tough enough then. It is all that three good mules can do to turn down a good alfalfa sod when three years old. For this reason then I don't like to leave it stand longer than that. I have had the experience of turning down an older sod and it is almost an impossibility, and so on this account I do not like to leave it stand longer than three years. Then, again, I like to think of it and compare alfalfa with red clover in rotation, because I believe the time is fast coming when alfalfa will, to a great degree, take the place of red clover. However, I am surprised even at the present time to notice the slowness with which the farmers of Pennsylvania are taking hold of such a valuable plant as alfalfa, but I believe the time is coming, and it is coming rapidly, when it will take the place of red clover, because when we compare the value of both plants, both crops, first of all withthe humus, the vegetable matter that each crop gives to the soil. Now, just this last fall I had the opportunity of comparing very favorably a three-years' stand of alfalfa with that of red clover. I just went over the one field and after having plowed the alfalfa sod I went with the men to the red clover sod and I wish I just could give you the difference in the vegetable matter that is turned into the soil from the alfalfa sod as compared with the red clover sod. And on this account, the great difference, the immense amount of vegetable matter we have from the alfalfa compared with red clover is very striking. Then, again, I like to have the rotation short in alfalfa because of the value that I get from turning a sod down each fall. My method is this: In the fall of each year I sow about twenty acres and turn that many acres down each fall, leaving if stand three years. Now, then, when I turn down a sod in the fall, for instance twenty acres, I am turning down part at least of these twenty acres with the fourth cutting. I only use about half of these twenty acres to soil my cattle up to the first of September, and in that way I have soiled my cattle up with the exception of two weeks—I am soiling sixty head—and these two weeks I might have supplied the alfalfa as well. And now I make only three cuttings for hay and the fourth cutting, one-half of it, I use in feeding from about the 15th of September until the 1st of November, and if you are not going to turn down the sod you don't have that corn feed from the middle of September on to the 1st of November, because you dare not cut alfalfa in my country after the 15th of September with safety. There is no important point in cutting alfalfa. We should not cut it if we wish to save the crop for another year, too close to winter. And so I have this advantage when I turn down the sod I can soil my cattle up to the 1st of November, which otherwise I could not. And, then, I have the advantage of turning down on these twenty acres a great amount of humus or vegetable matter. Now, I took from twenty acres this summer an average of six tons to the acre, from twenty acres in three cuttings. Now that was this one good result, but that came from the garden spots of the farm of 500 acres; that was the best soil I had. And, now, after taking off three cuttings of six tons to the acre I was able to turn down a sod of say, I believe, fifteen to eighteen inches at least, maybe twenty inches; and that amount of vegetable matter with the root system that the alfalfa gives. I tell you there is something going to be done when you turn down a substance like that. So that I thoroughly believe in short rotation on this account, because it adds to our soil more organic matter, more vegetable matter, gives more humus, and that is what we want in our eastern soil.

Then, again, I believe in short rotation because of the sod or the root system that we turn up in these few years' growth, the long tap roots that go down into the subsoil. Now this fall, when I plowed these twenty acres of three years' standing, the plow brought up roots that had gone down into the subsoil from fifteen to eighteen inches, mind you, fifteen to eighteen inches into the subsoil, and pulled them up out of the subsoil and deposited them in the upper layer of surface soil where the shallow crops can get hold of them. These food roots puncture that subsoil and when plowed add that plant food to the surface layer. I wish you could compare the root system of the alfalfa with the root system of the red clover. I have had results along this line. I have been able to grow potatoes and grow corn on sod that has been turneddown from the alfalfa sod and, friends, we may know something of the value of alfalfa as a food, but I say we don't appreciate at the present time the great value of this plant to our soils. We have yet a lot to learn along that line; but I say the time is fast coming when we will appreciate this more. I have had potatoes upon this sod and corn, and years when conditions were unfavorable I have had as high as twenty bushels more to the acre with the same tillage, the same planting and the same conditions practically all through, and I could see throughout the season I was going to get better results from the alfalfa as compared with the red clover. With the little experience I have had along this line I am enthusiastic over the outcome of this crop, what it is bound to give along this line.

I should be pleased to take up more time in the discussion of this subject, and present it from the standpoint of value as a feed, because I have had lots of good experience along this line, but I am more enthusiastic now because of the results that I have obtained just along the line of the value to our soil as a soil reviver and soil vigorator, and the man who plants it should look to this not only as selecting one of the best foods for his cattle and animals, but he can stand assured that it is going to be a great benefit to his soil as well.

I thank you for your attention. (Applause.)

The Chairman: We have another talk on this subject. Better let the other gentleman speak and then have the questions. It is not justice to the man who is to follow to have the questions now.

The next on the program is an address on "Alfalfa in Pennsylvania," by Mr. P. P. Gheen, of Overlook Farm, Willow Grove, Pa. I now have the pleasure of introducing you to Mr. Gheen.

Mr. Gheen: I don't think the man who spoke ahead of me is half as enthusiastic about alfalfa as I am. I don't think there is a man living in in Pennsylvania as enthusiastic as I am about it.

Mr. Gheen then delivered his address as follows:

## "ALFALFA."

### Mr. P. P. Gheen, Willow Grove, Pa.

What is it?

It is a leguminous plant and in reckoning its value, we cannot compute its value to argriculture.

We have record that it existed in Central Asia 490 B. C.

But in using the common sense view, we have, no doubt that after the third day, that God said, "Let there be light—there was light" that alfalfa as well as all other things existed.

From Central Asia it was carried into Greece.

From Greece to Rome—to Northern Africa—to Spain—

And thence to the Western Hemisphere.

Its name is Arabic, meaning best fodder.

And we feel that it has never belied its name.

Alfalfa in Pennsylvania and what it will do is what is interesting to us.

It is only a few years since it was introduced, and behold the multitude today that stand criterions to its culture.

There seems to be an unwarranted alarm that our soils are not adapted to it.

That we need inoculation.

That our July and August suns destroy it.

That it is not worth the effort it takes to get it.

Now we will take exceptions to any man who says it is a failure for us, and prove to him conclusively that it is one of the necessary adjuncts to successful agriculture and dairy husbandry.

Allow me the privilege of another assertion, if you please, sir.

That we, the people of Pennsylvania, can produce anything that will grow in a temperate zone as good as can be grown in the world if the right man is behind the gun.

We don't turn our backs to Kansas for bushel corn, nor the Dakotas for bushel wheat. Neither to any other place for any product of the soil in quantity or quality.

More than that, we have within easy access four of the best markets of the world.

The question has been asked many a time to my knowledge, "What piece of ground shall I select to grow alfalfa?"

Select ground of an upland nature with good natural drainage, sandy subsoil that is not water-logged, and various other instruction that the average man would forget one-half of before home was reached.

The following question:—

How shall I prepare my ground for the seed?

They would be instructed to plow, harrow, disk, roll, etc., not called for in any sense whatever to the average intelilgent farmer.

Then it would be followed with the third question:—

"How shall I fertilize?"

Lime abundantly.

Fertilize with complete fertilized lime the second year, etc., until the instruction the applicant had received would seem of such magnitude that he would abandon the project of alfalfa culture forever.

Gentlemen: If you contemplate alfalfa culture in the short way, permit me to explain how I have seen successful results:

Select from your soils any piece of land that you know will grow common red clover, and it is a fact that where one will grow so will the other.

In your selection you can take any piece of land you think is not giving the proper return from prior crops.

Plow and cultivate thoroughly by July 15th.

It is very necessary that this should be thoroughly limed with fresh slacked lime at this time, following with thorough cultivation until August 10th.

If you will treat your land liberally to cultivation before seeding, it is a plant that responds very quickly and you will reap handsome returns from the expenditure you have made.

With your permission I would like to say something in reference to cultivation of any crop at this point.

It is not a fact that we people, meaning farmers, attempt to do too much with too little.

It is very vivid in my mind that our soils are like the college man's brain.

You take the average college man, load his brain to the uttermost. Grant his diploma and turn him into the world to earn a livelihood at the mercantile business.

What will become of all the scientific training that brain has had?

To a great extent it will flourish and fade away, profiting the world nothing.

Where, on the other hand, if that scientific training is cultivated it will expand to the credit of the individual, showing the world the necessity of cultivation.

It is just as necessary for us to cultivate our soils to the uttermost, that the fibrous roots of the plant life may permeate every part of such that we may derive the whole benefit contained therein, and reap handsome returns therefrom besides the satisfaction of mind that the work was well done.

Returning to my subject:—

Be careful in the selection of your seed.

Make the attempt to sow on August 15th, or as soon after as possible, at the rate of eight pounds alfalfa, eight pounds common red clover to the acre, sown with broadcaster and harrowed in with a sixty-tooth harrow.

Sow fourteen quarts of timothy seed the opposite direction. Treat likewise with the harrow. The following year you will have red clover and alfalfa first crop.

Then two cuttings of alfalfa.

The next year first crop you will have a fine stand of timothy.

The two cuttings of alfalfa.

You now have your ground inoculated ready for alfalfa alone.

If your red clover fails at the sowing, so will the alfalfa.

The bacteria that cultures red colver cultures the alfalfa.

Too much cannot be said of the value of alfalfa.

They are to be divided into several classes.

The feeding value of alfalfa is about on the same basis as winter wheat bran containing twenty-seven per cent protein.

This value needs no explanation.

The second value is nitrogen gathering propetries leaving the soil in a better condition each succeeding crop, depositing on its roots through its leaf surface the most expensive fertilizer known to agriculture.

The third value is the amount of nitrogen gathered in proportion to any of its sister clovers.

The leaf surface of a thrifty stalk of alfalfa is about double that of common red clover.

The fourth value is the excrement from alfalfa fed stock contains about double the amount of nitrogen, potash, phosphoric acid as that from other fodder or hay.

Its fifth value is that once a stand is porcured you need have no concern for at least four years.

Its life is about double the time of average red clover as its life in two years.

About four times the life of Alseke.

Thus it is a great labor saver in this respect.

Its sixth value,—You rarely see noxious weeds in a field of alfalfa.

The constant cutting it will stand destroys other plant life.

This point makes it very valuable.

I have in mind a fiela ten years ago with an excellent stand.

Garlic sown to alfalfa and resown in four years.

The garlic at this time is gone and everything else of noxious weed kind.

It is not worth my while to tell anything more of its feeding value.

But, I will state one thing accomplished in the summer season of 1909.

The party had a dairy of eight cows.

The drought began June 15th and lasted until the alfalfa season was done.

By good feeding of green alfalfa each day from June 15th to October 15th the product of that dairy was increased $1,980 over any other year they were ever in business corresponding with the same period of the corresponding year.

With your permission I will state another fact accomplished with green alfalfa.

In the Spring of 1910 I saw chickens fed on Otto Weiss Chick Feed, sour milk, cut short green alfalfa make two and one-half weight in sixty-three days, with chickens worth forty cents per pound.

These are facts and not idle talk.

I know whereof I speak. And if the gentlemen who tries alfalfa and fails the first time will keep these few lines in front of him, commit to memory and report to his neighbor, they will sound like this and he will try again:

> If you strike a thorn or rose,
> Keep a-goin'!
> If it hails or if it snows,
> Keep a-goin'!
> 'Tain't no use to sit and whine
> When the fish ain't on your line,
> Bait your hook and keep on tryin',
> Keep a-goin'!

I have seen horses leave No. 1 Western clipped oats to eat second-crop alfalfa. The animal can tell us which is best.

I have seen dairy cows leave No. 1 Buffalo Gluten to partake of green alfalfa.

In fact, it is feed for the soil, for the animal, and for the owner's bank account.

In conclusion, I would encourage any man who owns ground that will grow common red clover to begin with alfalfa at once, and after he has harvested his first crops and burned the following winter's fire wood, it will not take an uncultured farmer like myself. to explain the advantage derived therefrom.

The Chairman: Now fire in your questions.

A Member: Do you find it necessary to put fertilizer on your alfalfa after you have got a stand, after the first year?

Mr. Gheen: No, sir; I treat it pretty liberally to nitrogen in the start, the moment I sow it. After that I never put anything on, and I follow out the same rule as the gentleman ahead: I let it stand four years. But I think three years nearer the right time.

The Member: You don't put manure or fertilizer on?

Mr. Gheen: Nothing after sowing; don't put anything on the ground during the three years.

A Member: How do you judge by the character of the plant so that you can make it last as long as possible, in cutting?

Mr. Gheen: If the strength is in the plant, just before it comes into bloom, that is about the time to cut for hay or anything else.

The Member: Then how long do you let it go?

Mr. Gheen: I would say cut again just before coming into bloom again.

A Member: I understood you to say that the red clover inoculates the soil?

Mr. Gheen: Yes, sir. The United States government put out a bulletin about eight or nine years ago. They said that the bacteria that would culture one would culture the other, and the similarity was so great they could not tell the difference; and that is what started me to grow red clover and alfalfa together.

A Member: I should like to take exceptions to what Mr. Green said about red clover. I stand for all kind of clovers and red clover will gather as much nitrogen and you can find as many nodules of nitrogen on the roots in proportion to the leaf surface as you can on the alfalfa.

Mr. McCallum: In regard to the bacteria being the same in both plants, alfalfa and red clover—now, if that is the case, why, my experience is very wrong. My first experience was a nine-acre field and I had no faith in the inoculation. That was humbug to me, yet I had faith enough to go to my father-in-law's field and get half a peck of soil and inoculate a small portion of about thirty square feet. Now, then, gentlemen, I have been growing red clover and the farmer preceding me had been growing red clover successfully on that field and on all the fields. Now then, that field the first fall after sowing had a beautiful stand and the alfalfa came up bright and early and a beautiful stand the next spring and along about the middle of April about three-fourths of that field began to get yellow and that little spot of thirty feet square was just as nice and green as possible, the part of the field that I had inoculated with the half-peck of soil, and three-fourths of that field turned yellow. The other one-fourth was naturally inoculated, what I considered naturally inoculated. If it is the same species of bacteria in red clover I don't understand why that entire field was not inoculated.

Mr. Gheen: I remember when we ha da meeting in the Market House two years ago a distinguished gentleman from New Jersey told you what I told you tonight, that the bacteria that grew one would grow the other, and that is the way they are going at it in New Jersey.

A Member: Did he not speak about sweet clover?

Mr. Gheen: That he did. But I called his attention to it as soon as the meeting was over and he said that where one would grow the other would grow, and I asked him about red clover and he told me that afterwards, and I am positive of that that where one will grow the other will grow on fair soil.

H. D. Connell: You spoke of using alfalfa in four-year rotation. What has been the custom and the crop that you followed the alfalfa with?

Mr. Gheen: I have no particular piece of ground, taking any piece of ground that will produce red clover. If rye stubble, I take it; if an old timothy sod, I take it. I take any piece of bround.

Mr. Connell: In other words, I would like you to suggest in following a rotation of potatoes, some of them being a little late, how would you suggest preparing that soil for alfalfa?

Mr. Gheen: It is too late after potatoes to sow alfalfa. You want to get your seed in there in time to have the proper top to stand the winter. If seeded in August it will have a root ten to twelve inches long before winter and will withstand the frost.

Mr. Connell: Would you recommend following early potatoes?

Mr. Gheen: You would want your potatoes out of the ground by August 1st, so that the ground is thoroughly cultivated. If you sow later than August 15th you will not get sufficient growth before winter sets in. That is where the mistake is.

Mr. Bayard: You all see this gentleman taking shorthand notes. That is done for a purpose and that purpose is to put all this matter in our annual reports, and the way for you to get these discussions and keep them by you is to become members of this Association, either the Dairy Union or Breeders' Association. Become members and get your annual reports and keep them and you will have something and you will want more of them. It will cost you one dollar a year—and we need the money!

The Chairman: Anything more on the alfalfa question?

A Member: We sow after wheat. When we have taken the crop of wheat off we seed the alfalfa after that and have had good success. We are now growing thirty-two acres.

Mr. Comfort: I think there is a point people want to understand. Different people have failed in growing alfalfa when they have got their ground in perfect condition because their ground was so mellow so deep down. I have in mind cases of this kind where the farmers afterwards took their wheat stubble ground, the ground that had been simply cut with the cutaway harrows, getting a shallow, mellow seed bed, and they got perfect success; where after potatoes with the ground tilled and worked all the time they failed unless the rains were very favorable. They got their seed bed so that it will hold the moisture where the seed bed after potatoes is often too mellow. Last year I know of one piece that was sowed where there had been potatoes and perfectly fine ground, and heavily manured; and in the same field another piece after their oats. There had been no rain for twenty-two days; but there was a fine set after their oats, but not more than one-third of the seed germinated after their potatoes. I have known where they have failed by their very fine seed bed, deep plowed and worked and replowed, where they succeeded by taking the wheat stubble ground and simply disking with Clark's cutaway harrow and then sowing the seed on the 15th of August.

A Member: Would not rolling have corrected that?

Mr. Comfort: No, I don't believe it would.

Mr. Shrum: I have a small piece of alfalfa I started on corn stubble ground in the winter. We top dressed it with manure and we plowed in the spring as soon as fit for plowing and limed it then and kept on harrowing until July and sowed the alfalfa and the next year we got three cuttings. After cutting the last crop we gave it a dressing of manure with the spreader, and gave a light dressing and got almost as much in the first crop this summer as we had the three cuttings the first summer. I believe the dressing of manure helped it. I did not do any inoculating.

The Chairman: There is one thing I have found out. Whenever you want to wake a meeting up you take up the alfalfa question.

Tomorrow morning there will be a symposium on the "Cost of Milk Production." There is another live subject and we have got to have you here promptly on time as we wish to close up tomorrow forenoon. After the symposium will be the reports of committees and new business and election of officers. I think if there is nothing more we will adjourn until tomorrow morning at 9:30 o'clock. Adjourned.

## REPORTS OF COMMITTEES

Mr. Norton: Gentlemen, we have a resolution here, presented by the Resolution Committee of the Pennsylvania Live Stock Breeders' Association, which is as follows:

RESOLVED, That we, the Live Stock Breeders' Association of Pennsylvania, urge upon our Legislative Representatives (now in session) the importance and value of a State Fair to the industrial, commercial and agricultural interests of all our people, and that we as an Association hereby respectfully request the Legislature to pass a State Fair Bill to be presented at the present session. That the Secretary be instructed to mail a copy of this resolution to the members of the Senate and House of Representatives.

The Chairman: Gentlemen, you have heard the resolution. What is your pleasure?

Secretary Critchfield: I move the adoption of the resolution as read.

The motion was seconded, put and carried.

The Chairman: The next will be the report of the Nominating Committee of the State Live Stock Breeders' Association.

Mr. Perham: Your Nominating Committee have left and turned their report over to me. It is as follows:

### Report of the Nominating Committee

President—Hon. W. C. Norton, Waymart.
Vice President—Dr. C. J. Marshall, Philadelphia.
Second Vice President—Hon. M. P. Shoemaker, Greensburg.
Secretary—E. S. Bayard, Pittsburgh.
Treasurer—J. F. Lantz, Wyebrooke.
Executive Committee—Dr. C. J. Marshall, Philadelphia; D. W. App, Sellingsgrove; James Blair, Hartstown; Henry Palmer, Avondale; W. F. Shrum, Adamsburg; W. M. McCoy.
Legislation—Hon. W. C. Norton, E. S. Bayard, Dr. C. T. Gay, Dr. Thomas Turnbull, H. W. Comfort, J. H. Reichert, W. E. Perham, Hon. M. P. Shoemaker, Greensburg.

The Chairman: What action will you take upon the report?

Secretary Critchfield: I would inquire whether there is more than one person named for more than one place?

Mr. Perham: There is not.

Secretary Critchfield: I move you then that Mr. Perham be instructed to cast the ballot for the persons whose names have been presented by the Committee on Nominations.

The motion was seconded, put and carried.

Mr. Perham: Mr. Chairman, in accordance with the instructions, I cast the ballot for the persons named for the persons named for the respective offices by the Committee on Nomination.

Mr. Norton: There is one report yet, the report of the Auditing Committee, but I see none of the committee here. Mr. Shoemaker cannot be here to make the report and as we have been paying out bills all during the meeting they will be included in the report.

I think there is no more business before you.

I thank you for the honor, for I consider it an honor to be elected President of the Pennsylvania State Live Stock Breeders' Association. I think this is the eleventh time. I will try to do my duty in the interest and for the welfare of the breeding interests of this State, and will do everything in my power to help along, but I am not unmindful of the fact that I will need your united co-operation as any one man can do but little in himself.

We will now stand adjourned.

## JOINT MEETING WITH STATE BOARD OF AGRICULTURE AND DAIRY UNION

S. S. Blyholder, Vice President of Board of Agriculture, in the Chair.

The Chairman: The first topic on the program for this evening is the report of the Veterinarian of the Board, Dr. S. H. Gilliland, of Harrisburg, Pa. Is Dr. Gilliland present? He does not appear to be, so we will take up the next subject: "Permanent Pastures and Meadows," by W. D. Zinn, of Phillippi, W. Va.

I now have the honor of presenting to you Professor Zinn.

## PERMANENT PASTURES AND MEADOWS

By W. D. Zinn, Phillippi, W. Va.

Ladies and Gentlemen: I think the Chairman said Professor when introducing me. I do not know whether to respond to that or not. I am a farmer, not a professor.

Friends, I am very glad to meet so many of the up-to-date farmers of Pennsylvania. I am sure you are all up-to-date farmers. They are the ones that attend the State meetings. As I look into your faces and see the interested expressions I appreciate being with you. That reminds me of a story they tell on a local preacher in my community. He always introduced his remarks like this: "My friends, I am glad to be here this morning, and I am very glad to see so many of you here." Finally he was invited to preach in the penitentiary and he began his remarks in the usual way: "My friends, I am glad to be here, and I am very glad to see so many of you here."

I am to talk a little while about Permanent Pastures. I come from an agricultural state, if you will permit me to call it such. You may think it a mountain state, a state of mountains and hills. We have them there. We do not have very much level land, and yet there are some places where you can find as many as five acres of level land unbroken by mountain or hill.

### Beef From Grass.

Only recently I attended a stockmen's meeting in my own state, a unique affair. A gentleman who had been shipping cattle for about twenty years or more, shipping export cattle, gave a dinner. He had selected a show steer that he thought the best he had ever bought, and having purchased forty thousand or more, we had a real roast. I took a census of that meeting and I found those present (80 in number) represented five thousand seven hundred cattle, export cattle nearly all of them were. That is, these men there grazed that many cattle. Out of that number of cattle but twelve hundred of them were grazed during the winter; the balance were fattened on the blue grass. I make this explanation that you can understand that we have some blue grass in West Virginia, but not as much as we shall have, and we have not taken the care of it we ought. But we like blue grass, friends, because we think it is a pretty easy way to make a living, and we West Virginians don't like to work any more than we can help. We turn the cattle out in the spring and see that they have water when they want it and that is about all the work many of the farmers there do. I know of farmers keeping one hundred cattle and not paying out as much as three hundred dollars during the year for labor. I have a neighbor who was present at this meeting, and he represents six hundred export cattle that he finishes every year; and I asked him: "Do you grain any?" He replied, "No; if I cannot fatten my cattle on blue grass I will go out of the business."

### The Price of Land

But I am boosting West Virginia. Our pastures are sources of great income. Sometimes when I talk to farmers in other states they say, why, land is too high to graze. You cannot afford to pasture hundred-dollar-an-acre land. Let us see if we cannot. In France today there is a lot of land that rents for ninety dollars an acre for grazing. Now, they must keep some good stock on it. The reason why we can't afford to pay the high prices for grazing land is that we do not put the right kind of stock on it. If we graze on this pasture land the kind of stock that is grazed in France, viz: high-priced breeding stock such as they ship to us and sell at fabulous prices, then we can afford to pay one hundred dollars an acre for good grazing land.

Our pastures in West Virginia, as well as in Pennsylvania, have been "running out." They don't produce as good as they did twenty-five to fifty years ago. In the meeting referred to, I asked the question: How many cattle can you carry now and how many did you carry twenty-five years ago? Some report that they only kept about one-third as many. There is something wrong. We understand at once why land runs out when farmed year after year. We know that the organic matter and the available plant food exhausted the land deficient in lime, and we have come to understand that the same thing happens with the grazing lands. Our grazing lands are deficient in organic matter and in lime, they having no available plant food, and we must take the same care of our pasture lands as of the farming lands if we want to make them keep up their productivity.

## Overworking Pastures.

Now, it shall be my purpose to discuss the ways and means of doing this. We want to look upon our farms and our pasture fields as animated objects. The fact is they have or should have a great deal of life. If you take your horse and work him without feeding him for three, four or five days a week he becomes lean and weak, and if you don't begin to feed him he will die. We have been working our pasture lands for years and years and only giving them half rations and it is not any wonder they have become unproductive. Our fields must be fed; they must be clothed and taken care of just like the human body. If we fail to do that they will not give the returns they should. The old Jewish law required that the land should have all that it produced every seventh year. I don't know whether those old Jews understood scientific agriculture or not, but they were practicing it. Every seventh year all that the land produced went back to the soil. For what purpose? To feed, clothe and make available the plant food for the next six years. Friends, I think we can improve on the Jewish method if we give the soil something every year. Let some organic matter get into the soil to make plant food available and that land will be productive for years to come.

There is no excuse at all for working out land. If you do not leave your farms better for your children than when you found them, you have missed your calling in life. Our lands ought to become better; they must of necessity be more productive if the people are to be fed, because everything that we have comes from the soil and, in the future greater demands will be made upon it; for we are told in fifty years from now we are to have two hundred million people in the United States, and all these people must be fed from the soil, so we want to take better care of it and give the land its share, no matter whether farming land or grazing land. If you are a tenant farmer you can rob your landlord year after year. I think I have had tenants to treat me that way. But if you are a land owner you cannot rob the land year after year without its resenting that kind of treatment. It will simply show this is to you and say "You have not given me a square deal; you have robbed me and I don't propose longer to give you a good crop." From these pasture lands you have been driving the live stock for years. If is is a dairy farm you have been selling the milk and in that milk there is a certain amount of plant food, the three elements that are found deficient in soils: nitrogen, potash and phosphorus. Whether we sell beef, mutton or milk we are taking available

plant food, especially phosphorus, from our lands. So, my friends, it is up to us to return this plant food to the soil in some way.

## Need of Lime

It has been shown that many of our pasture fields have run out because the lime content is too low. There is an acid condition in the soil and it is necessary if we wish to grow good pastures to apply lime to the soil.

The question of lime is interesting a great many people at this time. We are just awakening up to the fact that nearly all of our soils are deficient in lime. Over in my state a few years ago a farmer came to me who had a limestone field of seventy acres. Lying all over it was limestone rock. His clover had failed in his field and he wanted to know what was wrong with his ground. I said, "I suspect your land is sour." He replied: "It could not be. There is limestone all over my land. It is actually in the way." I said, "Have you tested the soil for acidity? If not, test it." The man got blue litmus paper and applied it to his soil and found a great deal of acidity in it and he applied five hundred pounds of granulated lime to the acre and the next year got a fine crop of clover and has been growing clover ever since. That proved that even these limestone soils are becoming deficient in lime and we have got to apply the lime and there is nothing under the sun that will take its place. I had a letter recently from a farmer who said: "I want to plant twenty acres to corn"—that letter was from this state—"I am in doubt as to whether to use phosphoric acid or lime on the land. What would you apply?" If the land needs phosphorus there is nothing will take the place of phosphorus, and if it needs lime there is nothing to take the place of lime. Test your soil and supply what it needs. I also told him that the probabilities were that the land needed both the phosphorus and the lime, because most of the soils in our state—and that is largely true in this state—are deficient in phosphorus as well as lime. You have been selling the small grains off the farm and these grains have carried away a great deal of the phosphorus, and possibly the manure has not been saved as carefully as it should have been, and you have been losing there and the soils are all deficient in phorphorus and we must supply it.

## Application of Lime

Going back to the lime question: There are various forms of lime we can use on the pasture fields. Where you have the limestone, as you have it up the valley between here and Hagerstown, all I believe you need to do is to crush that limestone and scatter it over the fields. It is the safest form in which to use lime, because you will not burn up the humus when you apply that ground limestone. There is some danger in using too much caustic lime. That burns up the humus and you deplete the soil of fertility. It will become a stimulant for the time being, but it will leave the land worse than it was at first. Be careful what kind of lime you use, especially on the pasture fields, because you don't have the chance to treat them as you might other fields, and I recommend the ground limestone for the pasture land. Lime sweetens the soil by the particles coming in contact with the particles of soil, hence it would be a great deal better and the sweetening process more perfect if you could plow that soul and mix the lime in because the contact would be more general. It may not be practical for you to plow up the field and put the lime on the top of the land. If not, you can get good results from the lime by simply sowing it over the land whether you plow or not. Sowing it on the sod will correct the acidity to some extent, but not as perfectly as if you plowed the land and applied the lime on top.

The other day I was "called" by a farmer when I said you can get too much caustic lime; he said: "I have used three hundred to four hundred bushels of caustic lime on the land and produced good crops for twenty years." I said, "How did you apply that lime?" He said: "We apply it in this way: We put it in small piles and let it lie there from two to four weeks and then scatter it over the fields." I said: "You are not applying caustic lime. That is carborate of lime." When burned lime is applied in this way it air slackes and air slacked lime is carbonate of lime. That is the reason why Pennsylvania farmers have been so successful in years past in using so much lime. They have been using carbonate of lime and did not know it; actually so, because that lime became air slacked when taken into the soil was in the form of carbonate of lime and did not burn the humus. It is dangerous, my friends, to put into the soil anything like three hundred bushels or one hundred bushels of caustic lime.

### Renewing Pastures

There may be various causes why our pastures become unproductive. As I have said, they may need lime, plant food and phosphorus. The dry weather may have caused the roots to die and the worms may have killed it. I have had all these things happen to my pasture land until I absolutely had no grass. What are you going to do then? If we could plow and reseed, the problem would be easy; but that is not always practical. I am going to tell you what I did. If it suits you, you can do it; if not, you can reject it. We go on to those fields and we harrow them. If the field is smooth we take a double acting cutaway harrow and that is the best I have tried. We cut it up pretty thoroughly so there is little or no sod left. That ought to be done as early in the spring as possible, February if the ground is in proper condition for tillage; if not, later on. March will do, and April may do. May I think is too late as a rule. I put the lime on before I start the harrowing. Sometimes with the grain drill, sometimes a lime spreader and sometimes with a manure spreader. And, by the way, my friends, there is no place on the farm that I believe you can get more out of the manure per ton except the meadow than on the pasture land. I have come to this conclusion, that we have been putting the manure to the wrong crop for years. My practice formerly was to manure the corn ground directly ahead of the planting of the corn. I never do that now unless I have more manure than I need in either of these other places. I can get the most out of manure on the pasture land, meadow land or on a soil improvement crop. If you are growing rye and you want to turn that rye down to improve the land you can get more out of the manure by applying it to that land so you have a good heavy crop to turn down.

I take the manure spreader and spread manure over this pasture field. Try a small acreage at first. If you have fifty acres, try five or ten acres; cut it off from the balance of the field. I use the woven wire fence for that purpose. Apply the lime and manure if you have it. I have applied commercial fertilizer, but I will speak of that later—and then put on some grass seed. There is little or no life in that soil, no plants there, so you want to sow some seed there, and this is one very important question for the farmer to consider. Twenty-five years ago, when I was a boy, my father would send me out to sow timothy seed or sow the ground to grass and we never thought of sowing anything but timothy seed, especially for permanent pasture. I sowed about a gallon to the acre and then we waited about two or three years for it to sod up. Now it sods up the next year with weeds if you don't put useful plants there. I think timothy is a very poor plant to sow alone in the pasture. It does not last long. It is a soil robber. It feeds on the surface; still I use a little of it. I sow four pounds each of timothy orchard grass and red-top seed to the acre. I don't know what you think about orchard grass. Some farmers say they would just as soon have broom sedge, but I like any kind of grass that makes the winter shorter and orchard grass shortens the winter. It stands late in the fall and comes early in the spring. So we sow a little orchard grass. Red-top will grow in an acid soil. It will grow in a sweet soil as well. It will also grow in a wet soil. If any of that land ought to be tile drained it will pay to do it. It won't pay to grass wet land. The red-top grows in rich land, of course; all plants do. It will also grow in poor land. It makes the sod thick and for that purpose I like to mix some red-top, say four to six pounds. Then I would put in some Kentucky blue grass. It is the greatest of all grasses in the United States, and if you have plenty of lime in your land I am sure you can grow it. I sow from seven to eight pounds of Kentucky blue grass and I would be sure that the seed would grow. A good many farmers do not like to sow it because they say the seed don't grow and I want to tell you what the trouble is in many cases. In Kentucky they gather the seed with a one-horse stripper. They driver over the pasture lands in June and strip this seed off and put it in bags holding from eight to ten bushels. The farmers sell this seed often before they get it into the barn. The dealers come out from the city and buy it in the field and haul it to the railroad and ship to some warehouse and there it becomes heated and then we buy it and don't get any blue grass when we sow it. Since I have learned this I have been buying my blue grass seed directly from farmers in Kentucky, those who are responsible, and they send me good seed and I have no trouble to get it to grow.

I would not stop with that because we have not put anything in the mixture that will add any plant food to the soil. Nitrogen is the only element of plant food that we can grow in the soil, and this is gotten there by growing some legume. I will sow nearly all the clovers. I would sow at least two pounds of white perennial clover, that will stay in the land indefinitely; two pounds at least of red clover and two pounds of alsike clover. We know that alsike clover will grow in acid soil more than red clover and will stay long. It is a cross between the white and red clover and has some of the characteristics of the white clover, being almost perennial in its habits. You could mix mammoth, but these three would be sufficient. Mix these? No. Sow the clover seed by itself and the grass seen by itself. If you mix them altogether and sow, you will not get an even distribution of seed because some of the seeds are heavier than others and fly out farther. Then harrow the seed in. I believe in planting seed grass seed just as much as planting corn and there is no farmer that goes out and throws his corn on top of the ground. They always plant it, and I believe these seeds ought to be planted. A good many farmers in seeding have been losing their crimson closer. They sow it but don't get a plant. Nearly everyone, upon investigation, has sown that seed on top of the ground. It is a large seed and possibly germinates and it does not get enough moisture until it withers and dies. That ought to be harrowed in. And so with most of the seed. We should harrow them over; a brush will do; anything to stir it in; and by all means have the seed bed as good as you can get it; if you must, harrow it over several ways. There are fields in West Virginia from which grass has died out and we cannot harrow them. The only thing we can do is sow some seed over them. Some of them ought to be reforested and, in fact, I believe that some fields in Pennsylvania should be left go back to forest or have trees planted on them, locust or something else, because they are not worth taking care of and will never make good pasture lands.

### Fertilizers on Grass

Now, these plants will need some fertilization, some available plant food, and before I harrow the land last time I use some commercial fertilizer, and on the character of the soil, my friends, should depend largely the kind I would use, and by kind I don't mean any brand. I am asked: "What brand of fertilizer do you use?" It does not matter about the brand. There are a great many farmers, it is true, in West Virginia who buy commercial fertilizer by the smell. If it has a strong odor they say it is the very kind of goods they are looking for. It may not be worth five dollars a ton. Again, they actually buy for color; if it has a good, dark color, that is the thing theywant. Imet one of these fellows coming from market with a load of fertilizer. I asked him what he paid for it. He said he got a confidential price on that and he promised the dealer not to give him away. I am always afraid of these confidential fellows, and I began to insist on his telling what he really paid for it.

The analysis was this: One per cent. of nitrogen, 7 per cent. of phorphorus acid and 1 per cent of potash. I figured that it was worth about ten dollars or ten dollars and sixty cents from the commercial value of phosphorus, nitrogen and potash, present value. After I had insisted that he tell me, he said he got it for nineteen dollars a ton, and that the dealer had sold it regularly for twenty dollars. I said: "You are the fellow who should not want to tell anybody. You paid two prices for fertilizer." There are a lot of farmers doing that. We are buying even what our land does not need. If this pasture lan dis heavy clay soil and has a reasonable amount of vegetable matter in it, it doesn't need potash. I don't need it on my fields. I have asked my fields what they need and this is the best test and only correct test when we askth eland. The chemist cannot tell you. He can analyze the soil and tell you how much phosphorus, nitrogen, humus and lime is there and a lot of other things, but he cannot tell you how much is available. The farmer must ascertain that himself, and I found I did not need potash and nitrogen on my soil when I asked the land what it needed by checking it and by putting on one plat the fertilizer and on the other nothing, and I found my land needed only phosphorus. I did not get any appreciable increase by applying nitrogen and potash on the clay soils. I am not speaking of sandy soils where you may need some potash. In all probability on the clay soils you need to apply only phosphorus; you may need nitrogen. And I would say after you have sown that crop you can tell to the foot where you applied the phosphorus. I put on one hundred pounds of nitrate of soda on the grass after it is started up well. That will nourish it until the roots run out and get plant food to grow it. It is one of the best things to put on the grass started on timothy meadows. The land may need nitrogen and I believe in that way by applying at the time of sowing a mixture of potash and nitrate of soda, tankage and fish scrap or something of that kind so that it gradually becomes available.

Another thing we want to remember in applying fetrilizer on plowed ground is, that potash and phosphorus become fixed at the point of contact. If you apply on top of the land and don't harrow in afterward the danger is that it will become fixed at the surface; so you want to stir the soil. I harrow thoroughly to get it down. Fixation takes place within twenty-four hours after application.

### Permanent Meadows

I have said nothing about permanent meadows. How many have permanent meadows that you don't plow? I want to see if there are any farmers who have them. Quite a few. I think, myfriends ,that we ought to have just as few of them as possible. Really, I don't believe very much in permanent meadows, and yet there are farms on which we must leave a certain piece of ground to meadow indefinitely, and they must be fed like the pasture field. There is not an acre of ground that pays better on my farm than my meadow lands because they produce heavy crops of clover and timothy hay. We get from twenty to twenty-two dollars a ton for it. Some farmers have meadows they wish to maintain. Those meadows run out for the same causes that the pasture lands run out. They need feed. Some of my neighbors have been following this method: They cut up the meadows immediately after harvest and reseed, and there is no better time to do it if the season is right. The mixture they use is timothy, red-top and clover. Experiment with alsike and red clover. They sow a little commercial fertilizer because they want a good growth and we must get it ready to go into winter. If you have manure you can apply it. The farmers have been flattering themselves that they were giving back to the soil all they took from it, but they were not. They were robbing it every time by pasturing it too closely. This we ought not to do. We have been grazing too closely. When I began the business of farming I began with a mortgage and I went out and bought sheep and turned them in to the grass I had left in the fall. I would have better carried the mortgage longer. You cannot afford to graze your meadows closely. In fact, I don't believe a meadow ought to be grazed. I believe the ideal way of handling a meadow is to take the first crop off and then, unless the other crop is large, let it go back to the soil, covering up the land and making available plant food and furnishing organic matter to the soil to grow the crop next year. When we cut the hay and haul it off we should put the manure back or apply commercial fertilizer and feed that meadow. We ought not to expect it to do well unless we feed it regularly. I have a neighbor that top dresses his pasture lands every third year with acid phosphate, two hundred and fifty pounds to the acre, and he has some fine cattle and some fine pasture.

The Chairman: Have you any questions to ask Mr. Zinn? You have an opportunity to bring out any thoughts you want.

A Member: I would like to ask if you would prefer plowing to harrowing the worn-out meadows?

Mr. Zinn: Yes, sir, but I take it a great many have pasture lands you do not want to plow at all, as we have in West Virginia. I would always plow if the land was right so that itcould be plowed and prepared in that way because you can do a better job and turn under any cover crop, like plowing down some rye and increasing the organic matter in the soil. Where you cannot do that, the harrow is the next best thing.

A Member: Would you recommend the clipping of the second crop of clover or let it grow?

Mr. Zinn: I would not let it ripen the seed. When a plant ripens its seed it has fulfilled its mission in the world, and that is the reason the farmers don't get a good stand if they wait until it ripens its seed before clipping.

A Member: Certain of our permanent pasture fields become infested with growing weeds. How do you treat that?

Mr. Zinn: Now, my friends, I believe this, but I don't know whether our scientific friends will agree. I believe the soil's natural preference is to grow useful plants rather than weeds if conditions are what they should be. Weeds come because the soil often needs lime. I saw that in Ohio. A farmer had sown timothy. The field ha dbeen covered with broom sedge before that. At the time of seeding to timothy he took the manure spreader and drove promiscuously over the field and scattered the lime right and left over the field and two years after that I could see the tracks made by the horses in going over the field. There was nobroom sedge there. The lime had not driven the broom sedge out. It increased the growth of the timothy to such an extent that the broom sedge was crowded out. If there is enough available plant food in the soil we are not going to be troubled with weeds much.

A Member: What is the cheapest way to put on lime, either the hydrated, the ground limestone or burned lime?

Mr. Zinn: That depends very much on what it costs you. Hydrated lime has a wonderful reputation. The manufacturers are doing just like food manufacturers. If I was selling hydrated lime I might do as the others do. Remember, hydrated lime is forty-four per cent moisture. The only advantage over the air-slacked lime is the even fineness and in mixing the soil contact will be more perfect. If I can buy the ground limestone at one-half the caustic lime would cost me, I would say certainly use the ground limestone all the time. Sometimes we have to ship too far and then we buy caustic lime and sometimes we allow it to air slack and put in on as carbonate of lime. The distance of shipping and distance to haul has a great deal to do with it. Remember that one tone of ground limestone is the equivalent of 1,120 pounds of caustic lime, so figure on that basis the paying price.

A Member: I would like your thought on using red top, which is sometimes considered a weed.

Mr. Zinn: I like to use the red top in that timothy because it will make the timothy finer and heavier and will help to hold the weeds down. And then the second reason I use red top and other grasses in the pasture land, is that it furnishes the stock a variety of food and that is absolutely necessary. I am very fond of corn bread, but I am afraid if I had to eat it three times a day for 365 days I would get very tired of it; and so it is with the animal. It would soon tire of one food all the time. Did you ever sit on the fence and watch them eat? When they are full of grass they will bite off a weed. I want to satisfy that appetite by sowing a variety of seed and I will do that when I sow nearly everything I can get in the form of grass seed in the field.

The Chairman: Is Dr. Gilliland present? Dr. Gilliland is to make the report of the State Veterinarian, but he does not appear to be present, so we will take up the next subject on the program: "The Pennsylvania Stallion Law," by Dr. C. J. Marshall.

Dr. Marshall: Mr. Chairman and Gentlemen: I was requested sometime ago to give you something on the subject of "The Pennsylvania Stallion Law." I wondered why they asked me to speak on such a subject. I know there are a great many here that know a good deal more about the stallion law than I hope to. I have had an opportunity to be interested in it a little. I think in January, 1908, the Pennsylvania Stallion Law was instituted in this State, and it has been making good progress since it was in effect. Dr. Gay, the man who has had charge of the work, is very much interested in it and I doubt if we could get a better man in America to take charge of the laws of this character. So far as I know, there has been very little trouble in instituting this law or in the workings of it. I imagine in the future you will appreciate it much more than in the past.

I have prepared a few remarks here. It is well to get down the subject and if you will excuse me I will read them.

## "THE PENNSYLVANIA STALLION LAW."

### By Dr. C. J. Marshall, State Veterinarian.

The stallion law has now been in operation for three years, and in that time has been able to demonstrate both its strong and weak points. That much good work has been accomplished can readily be shown, and that amending the law would still better the horse breeding industry is a foregone conclusion.

Primarily the law has been of great educational value. Heretofore in many distances farmers bought stallions without considering whether they were registered or not. As long as the seller made a statement to the effect that a horse was pure bred and registered the buyer was satisfied. Advertisements, such as "An Imported Engilsh Shire Stallion Registered in FRANCE and America" (this fact was actually printed on a stallion poster) demonstrates that the owner evidently did not know what pure bred and registery meant. Now, however, they realize that in order to secure a pure-bred license they must have an authorized pedigree registry certificate, and they have become far more careful.

The requirement of the law, which state that copies of the license certificate shall be posted prominently on the inside and on the door of the stable in which the horse is stood, and that a copy shall be incorporated in all advertisements is a good means of preventing misrepresentation by the stallion owners themselves; because the license certificate differentiates distinctly, in large type, between pure-brd and grade. Thus, a prospective breeder immediately on viewing the license certificate can see whether or not the stallion is of pure breeding and registered, or whether he is a grade.

I do not believe there is any business in which there is more trickery than in horse dealing, and for that reason it is necessary for breeders to use an extra amount of caution. Many men who are otherwise honest do not hesitate to deceive even a friend when a horse deal is being negotiated. Fraudulent pedigrees and pedigrees from unauthorized associations were a very common occurrence but now, knowing that they will not be accepted as a means of securing a pure-bred license they are less frequently found.

The Bulletins issued by the department on horse breeding topics have also been a great help to stallion owners, in fact horsemen in general. However, they have no immediate bearing on the subject of this paper.

The stallion law has encouraged breeders of good horses by giving them protection, and they have in consequence been buying many more pure-bred stallions than heretofore. To show the actual increase let us take the number of pure-bred horses licensed in 1908, which was 666, then in 1909 there were 823 licensed, an increase of 24 per cent; and in 1910 there were 909 licensed, an increase of 10 per cent, while the grade stallions have also been increasing the percentage of the increase has been markedly less. In 1908 there were 1,333 grade licenses issued; in 1909 there were 1,427, an increase of less than 7 per cent, and in 1910, 1,474 grade stallions were licensed, or an increase of only 3½ per cent.

The ratio of increase has been about three pure-bred stallions to every grade. Not only have the pure-bred stallions brought into the State increased in numbers since the enactment of the stallion law, but the horses have been of a better type, especially among the draft stallions.

The present stallion law is good so far as it goes, but under its provisions it cannot go far enough. The owner's affidavit is a bad feature, but it is impossible to demand that each stallion owner have a veterinarian examine his horse, as in some counties they have no qualified veterinarian. The only means of being sure that a stallion is up to standard is to have a commission appointed which shall examine all the stallions in the State, similar to the way it is done in New Jersey. This would be an ideal means of having all horses passed upon in a uniform way. As it is, there is too much difference of opinion as to just what constitutes a stallion of the best type. This inspection would also bring to light all valuless grade stallions, which, although techincally sound, are of such inferior breeding, type an conformation that they are a detriment to the horse breeding industry.

A stallion would not necessarily have to be examined each year he is in the State. This could be modified; perhaps stating that all stallions which had been passed by the commission and had attained the age of say 10 years would be exempt from further inspection.

Then, too, instead of issuing merely three forms of license certificates, namely: pure-bred, grade and cross-bred, it would be better, it seems to me, to have some distinction between pure-bred stallions at least. There should be a class for pure-bred stallions of the highest type, second best, and so on. This would give the mare owner a better idea of the worth of a stallion. As the law now stands any horsethat is properly registered with an authorized association, can secure a pure-bred certificate; this puts a prize-winning stallion in the same class as a horse which (A1, thought by the letter of the law is entitled to the best certificate) is inferior as to type and conformation. These kind of licenses, however, could not be issued unless a personal inspection were made by the authorities in charge of the enforcement of the law. If the commission before mentioned were a fact, of course, it could also take care of classifying the various stallions.

The Pennsylvania law is one of the few exceptions, in not having a lien clause in it. Eight States and one of them is Pennsylvania, have no lien on the colt, or mare and colt, for a stallion service fee. A clause of this kind in the law would not only encourage breeders to buy better stallions, knowing that they would be able to collect the fee agreed upon, but also, would be an excellent means of enforcing the law. If a lien clause were incorporated in the stallion law, stating that only such stallion owners as had complied with all the requirements of the law, could avail themselves of the right to collect fees under that law, it would naturally make all stallion owners very desirous to fulfill all the provisions of the law.

Much criticism is made in regard to the fact that there is no specified list of hereditary unsoundness in the law. This fact, however, was gone over in detail by your committee at the meeting two years ago. Since that time Dr. W. L. Williams, of Cornell, read a paper at the annual meeting of the Pennsylvania State Veterinary Medical Association which confirmed in every sense of the word the report made by your committee on this subject and brought out more forcibly the importance of allowing great leeway in the subject of hereditary or transmissible unsoundness or disease. There appears to be no condition in the list of those usually considered as hereditary unsoundness without illustrious exceptions.

After all the subject of type and conformation appears to predominate most prominently in the subject of transmission, and while we would not recommend prospective buyers to purchase stallions that are afflicted with blindness, ringbones, spavins, navicular diseases, cryptorchidism, roairng, heaves, or sidebones or breed to such during service, the law should deal with them leniently and clients should not be too critical.

The Chairman: Is there any questions to be asked or discussion on the subject before us?

A Member: I would like to ask if there is any objection to breeding to animals after they are 10 years of age?

Dr. Marshall: This gentleman asked me once tonight if there is any reason why we should not breed to a stallion that developed roaring after 10 years old. I don't think there is. I don't want to be understood as recommending you to breed to roaring horses, but there are a great many good horses that develop roaring and I don't believe transmit it. There are a great many cases in which the breeders have investigated the question of transmission of roaring and it was the exception where they could find a case where roaring had been transmitted.

There are good draft horses that in the winter develop asoturia; they are horses of good conformation, good condition and good age, and every cndition favorable, are what we want an dthe best kind of horses. They develop asoturia and they usually die with it, but I don't think that is any argument why we should not breed for that conformation and try to breed for that class of horses. I would say that it is not a dangerous experiment to breed to horses that develop roaring after 10 years of age.

Mr. Moore: Would you recommend cutting out of grade stallions?

Dr. Marshall: I would as fast as we could get pure breeds to take their places. I don't think I would recommend cutting them out at once.

Mr. Norton: The reason I asked that question is that a great many owners of stallions come to the conclusion that in order to protect the pure-bred horses the grade horses should not be allowed to be registered.

Dr. Marshall: I think we should encourage in every way the pure breeds, ans as fast as we can adopt that kind of breeding. I think it better to get rid of grades. I don't see any other way we can get at it.

A Member: Isn't it a fact that we have many grades throughout the Commonwealth that are better than some pure breds?

Dr. Marshall: I think that may be true.

A Member: Why would you advocate a measure that would cripple that feature of the industry?

Dr. Marshall: Well, I don't know that it would cripple it. I think it is a benefit to get work horses from pure-bred sires rather than from grade sires. We would get better horses. I don't see or understand that that recommendation would cripple the trade.

A Member: Well, it would have more or less effect upon it if we go so far as to prevent such a stallion from being registered.

Dr. Marshall: If I was going to breed horses I would want to get the best I could and even than I would want the registered horse if I knew he transmitted his qualities.

A Member: What proportion of light, medium and heavy draft stallions are there in the State?

Dr. Marshall: I don't remember just how those proportions run. There are a great many more heavy draft horses being brought in. There are not so many Thoroughbred or running-bred stallions in the State; and I don't think there are a great many standard bred trotting horses. I think the tendency is more for draft horses than Thoroughbreds.

A Member: How do you prevent asoturia?

Dr. Marshall: I don't know that we can always do that. I think we can sometimes. The best preventive measure that I know of is to cut off the feed when heavy strong horses are standing in the stable and always give them a little exercise. Don't leave them standing in the stable on a holiday and Sunday with the same amount of feed. If you can give them 20 minutes' exercise and cut down their feed one-third or one-half I don't believe there is one case out of a hundred that asoturia will develop.

A Member: Doesn't it develop oftener among the class of horess men are alolwing to stand to get ready for spring trade?

Dr. Marshall: That may be the way in the country, but in the city it is most always horses worked hard every day, then there comes a Sunday with a holiday ahead or back of it, to make two days that the horses stand in and they naturally get the same feedas when out at work, and a great many get paralyzed and usually die. I believe in the country you don't have so much danger of dying. In the country districts they tell me they get well frequently, but in the city we usually have a dead horse when we get one paralyzed in both hind legs. The exercise and cutting down the feed are the best preventive measures.

A Member: Will a horse get enough exercise in a large box stall?

Dr. Marshall: Not enough to prevent asoturia. That will help some.

A Member: Cutting down the feed is it?

Dr. Marshall: Has more to do than the exercise. Cut the feed out entirely and big fleshy horses will be better off if not fed at all when standing in than if fed.

A Member: What would you give a 1200-pound business horse used in the summer, but with not much to do in the winter?

Dr. Marshall: Give him some hay.

The Chairman: Are there any other questions? If not, is Dr. Gilliland present? He does not appear to be.

Mr. Norton: I will make a few announcements and then we will call on someone else.

Tomorrow morning the State Board of Agriculture will meet in the auditorium over at the Board of Trade. The Pennsylvania Livestock Breeders' Association will be at the South Chestnut Street Market. The Pennsylvania Dairy Union will meet in this room. The Horticultural Association will meet in the upstairs hall at the Board of Trade. Thelivestock demonstration will be at the South Chestnut Street Market Hall. Tomorrow all of the livestock meetings will be there in the way of demonstrations of beef cattle, dairy cattle, horses, sheep and hogs; and the steer and hog that are to be used in the meat demonstration Thursday afternoon will be killed tomorrow afternoon, and the demonstration of the cut carcusses will be here in this room on Thursday afternoon.

The Chairman: Are there any other announcements to be made? If not, I see a gentleman in the rear of the hall I know you will all be pleased to hear from, and that is Professor Agee, of State College.

Professor Agee: I appreciate this invitation. You have a full program this evening and I am sure that you do not want to hear from me at any length. I am glad that associations, representing special interests in Pennsylvania agriculture, have finally arranged to hold their meetings during the same week of the year and at the same point in the State, so that all of us may get into touch with each other. This is the way Ohio has done for a long time, and great good has resulted.

I am sorry that I did not hear my friend Zinn discuss the subject of permanent pastures before you this evening. I should not say anything about making sods as I did not hear Mr. Zinn, but you will allow me to emphasize the truth that good, heavy sods are the stepping stones to agricultural prosperity in our State. We can make such sods, and I know that he told you how he is doing so on his own home farm. Pennsylvania is adapted to grass and when we fertilize the hills of this State we can have sods. Our farmers continue to ask about fertilizer for corn. When this land is thin and must be planted with corn, of course fertilizers should be applied; but the right place for commercial fertilizers is the land seeded to grass. We can seed grass so liberally that the sod will make a big corn crop, and we can do this with double profit. When land is seeded down it should have liberal fertilization, and if the sod is left more than one year for mowing it should receive a heavy application of fertilizer early each spring. We have tested this out on thin land at State College, and it is one of the best object lessons our Experiment Station now presents to the farmers of the State.

I presume that Mr. Zinn advocated the use of lime on all soils that are acid. In Pennsylvania, three-fourths of the farming land has a deficiency in lime. If we do not meet the lime requirements, the grass and clover plants are not properly fed, and we do not get the sod that gives pasture and hay; and we do not get the organic matter for the corn crop that follows:

I hope that you expect me to say something of our School of Agriculture at State College, as I cannot afford to stand before Pennsylvania farmers and not mention this work which seems so important to me. We have 625 students in agriculture at the College now, and next year we will have 800. Many of these men are going back to Pennsylvania farms. Two hundred and twenty-five of them are taking courses that lead only to practical farming, and a considerable percentage of the remainder are planning to own farms and live upon them just as soon as they are able.

A Member: What are you doing for the girls?

Professor Agee: We have a Domestic Science School that can train a girl so that she will be as good a homekeeper as her mother is. She can do her work better because she will know more about the sanitary laws and more about chemistry. Why should our Pennsylvania farmers send their daughters to schools that do not prepare them for the practical work of life? They have a right to a knowledge of the science relating to homekeeping just as well as the boys have aright to the science that relates to agriculture. We now have only 30 girls in our Domestic Science School.

A Member: You ought to have 625 to keep up with the boys.

Professor Agee: Well, you must count upon one or two of the fellows not being the right kind of material for husbands, so we will say that 623 girls would be about right. They should be in the school and we should send them there. The girls have a right to vocational training. It is not square to them to give only such training that they must go into the school room year after year, instead of being fitted for the world's work so that fellows on small salaries can afford to marry. When our young men come to my office to talk about the work that they should engage in, I say to them: 'You should look ahead to the time when you will make a home. That is what you are working for, no matter whether you realize it or not. It will only be a few years until the best thing in your life will be a home of your own, and you should plan your life work with this end in view. If a girl has not been trained to work with her hands and believe that home-making is wholesome work, the question of the college man making a home cannot be solved.

I would not have you think that I am pleading for the Pennsylvania State College. I am interested only in the young people who shall have the training that will make them worth while in this world, and State College is the opportunity because it furnishes vocational training. If it did not do so, it would not deserve any special consideration.

The Chairman: Now, we would like to hear from that one exception, that one young man that is not worthy of a home of his own, Professor Van Norman.

Professor Van Norman: If this thing keeps on I will have to do something in self-defense. Why I should be singled out I don't know. I guess my condition is different from the others. Most of you grew up in some one place and spent so much time with some one girl that she got you to think that you owned the girl and you got married. On the other hand, I have been on the run all the time and never seen the same girl twice. I don't know why it is that my job has kept me on the move. Between you and me—and I would not tell this to the dean—the facts of the case are that I have not been at the college two months in succession in one and one-half years. I was here today and day before yesterday down in Chester county; four days before that I was in Chicago trying to start up a dairy show and week before that in New York trying to help the airship fellows. I don't see how a man can get married under those conditions. I think the wife would have a sorry job if he was married.

Getting to something of a more serious nature, it is gratifying to us who have been struggling with educational problems to see the interest and enthusiasm being awakened in our lines. When I left Indiana and came here five years ago there were 14 students in the four-year course and 52 students in the winter course, making 66 students that first winter. Some of my western friends called me a fool for coming to Pennsylvania. I told them that the clouds were gathering, the storm was due; it was going to come no matter who came here. The storm was coming; the boys followed the storm into the college and they are coming still.

I believe, looking at the opportuinties in agriculture today, that they are big because it takes a bigger man today to be a successful farmer in the next 10 or 15 years than you men have been in the last 15 years, and the boy who goes into the next 15 years' of work with no better training than you, he is not going to get up as you have, because the conditions have changed and the man who meets those conditions must be better equipped. He must have a better knowledge of the fundamentals and principles of science that underlie the whole thing and must have a better understanding of what they call business principles. I am going to have a crack on the other side of it. This great country of ours in keeping developed has been made possible because of two or three things: One of them is organization and another is knowledge of the cost of production—bookkeeping, in other words; and I believe our successful farmers of the future must know more of how to keep account of what they are doing. I have had men come to my office and say a certain line of work was not paying, but they could not give the figures for it so that the man might be sure of what he was doing. It takes a good deal of figuring and head work and wise skill to balance these things up. I believe the opportunities before the young men of our State today are immense.

There is another side to this that has not been brought out. We have in this great State thousands of men who in the years gone by left home and went into the city to study law and medicine and manufacturing and business, and now the good father and mother they left there on the farm have gone on and they have got the farm and the farm is up here in the country, and they are writing to us up at the College to send a man to come down to the farm and bring that farm up and to keep it up, and we have not got the men. Ther are 42 men in the class today and only four looking for a job. I want one but Ihave seven men that want the other three, and yet there are thousands of boys in this State of Pennsylvania that could equip themselves to take charge of these farms and get the experience at the other fellow's expense. That is why I stick to the College—all the mistakes I make the State pays for. If I ever get enough money saved up to buy a farm I will get this experience at the expense of the State. And the fellow that runs the other fellow's farm is going to get a lot of experience more or less at the other fellow's expense. There are thousands of boys competent to carry on these farms and render good service if to practical experience they will add training that they can get at our college or some other. You must know that boys working out at $15 to $25 a month and many of them at $10 a month, if they would equip themselves to meet these places you could not tie them home to work with you; and that is just the ideal situation. I tell you the ideals are big. I think you will hear enough of me before the week is through. (Applause.)

The Chairman: We would like to hear now from Dr. Marshall, our newly appointed veterinarian.

Dr. Marshall: I hardly know what to say. I have undertaken a work I know you are all interested in, and I want to serve you the best I can. It will be my aim to carry the work on as it has been organized and do the work to the best of my ability. In any way I can assist any of you in doing this, just call on me and see what I can do. I will try to do my best.

I presume you all knew Dr. Pearson and knew a lot about the way the work was organized, and you helped him organize it. I know this Breeders' Association is one of the biggest backers that the State Livestock Sanitary Board has ever had, and many of the members have assisted the State Livestock Sanitary Board in ever way; and if I have to call on you for assistance in the future I hope you will be as prompt to respond as you did with my predecessor.

I do not know that I can say anything more. I will just repeat, that if there is any way I can help you just let me know. (Applause.)

The Chairman: Now, gentlemen, I hope you will all take advantage of the show or displays that are upstairs. I know they are worth looking at and examining and studying; and all bear in mind the meetings that will be in session tomorrow morning.

With that, you are excused for the evening.

Whereupon, adjourned at 9:15 o'clock p. m.

## MEMBERS PENNSYLVANIA LIVE STOCK BREEDERS' ASSOCIATION

App, D. Norman, Selinsgrove
Armsby, Dr. H. P., State College
Andrews, D. C., West Newton
Andrews, J. C., Mattie
App, F. S., Millersburg
Arbuthnot, Dr. T. S., Pittsburgh
Arkcoll, W. W. Blake, Paoli
African Ostrich Farm and Feather Co., Bloomsburg

Bronson, John W., New Galilee
Blair, James, Hartstown
Bebout, J. C., Canonsburg
Berry, R. P., Eighty-four
Berry, John M., Wylandville
Berry, S. W., Canonsburg
Barnhart, Geo. S., Greensburg
Black, W. C., Mercer
Black, George, Dayton
Buchanan, Chas., Utica
Barley, J. I., Baker's Summit
Burns & Adams, Imperial
Bughman, H. C., Pittsburgh
Burgin, Jno. H., Huntingdon Valley
Brownlee, N. O., Claysville
Benninger, W. N., Benningers
Blyholder, S. S., Neale
Barber, Col. S. F., Harrisburg
Barclay, Dr. W. F., Pittsburgh
Burket, John W., Greensburg
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Berger, A. C., Etters
Baird, Benj. B., McClellandtown
Barton, H. A., Murdocksville
Baldridge, W. H., Latrobe
Bayard Bros., Waynesburg
Brookmead Farm, Devon
Burr, H. R., Brandywine Summit

Campbell, E. M., Leechs Corners
Cummins, John, Waynesburg
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Cooper, M. A., Washington
Christley, W. G., Mercer
Christley, W. L., Slippery Rock
Clark, M. N., Claridge
Cowan James H., Mercer
Comfort, H. W., Fallsington
Chambers, W. H., Claysville
Critchfield, Hon. N. B., Harrisburg
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Conard, Dr. M. E., Westgrove
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Drubler, E. S., Media
Dickson, W. S., Bakerstown

Davis, Mrs. Parker, Newtown
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Fritz, Mrs. Sarah B., Duncannon
Ferguson, W. H., Altoona
Fielden, Henry Devon
Faust, Samuel, Obelisk

Glover, J. N., Vicksburg
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Gammell, E. W., Bethany
Gable, Wm. F., Wyebrooke
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Henderson, J. B., Burgettstown
Husted, J. M., Uniontown
Hartley, R. S., Youngsville
Harmon, T. D., Pittsburgh
Henderson, H. E., Buena Vista
Hogg, Geo. A., Pitsburgh
Hutchison, G. G., Warriorsmark
Hopkins, W. W., Aldenville
Hershey, C. A., Gettysburg
Hull, D. W., Waymart
Herr, J. A., Lancaster
Hubbard, F. N., Troy
Holland, John B., McDonald
Hartstown Grange, No. 1233 Hartstown
Houghton, J. Paul, Paoli
Hunt, Dr. Thos. F., State College
Harity, J. I., Gettysburg

Innes, J. K., Binghamton, N. Y.
Isett, Sidney T., Spruce Creek
Johnston, Wm. R., Schwenkville
Johnson, Edwin, Dolington
Jager, Theo. F., Lebanon
Jones, B. F., South Montrose
Jones, Daniel W., Wilmore
Johnston, Ira W., Butler
Johnston, Curtis B., North Warren
Johnson, Wm. R., Graterford

Klein, Dr. Lewis A., Harrisburg
Knarr, W. H., Greensburg
Knapp, G. H., Aldenville
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Kidd, J. H., Mars
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King, M. G., Mount Wolf
Keim, Wm. P., Pottstown
Kusch, A. B., Newtown
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Love, R. S., Mount Pleasant
Levis, F. W., Chadds Ford
Ludwick, S. R., Sheridan
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Lockett, Dr. Stephen, Philadelphia

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McCoy, Robert, Slippery Rock
McSparran, W. F., Furniss
McCleary, Wm. L., Washington
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McDowell, S. V. & Sons, Fredonia
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Munce, R. L., Canonsburg
Meloney, James, McDonald
Martin, Hon. A. L., Harrisburg
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May, L. D., Granville Center
Murphy, Jas. L., Reedsgap
Miller, A. K., Pittsburgh
Minner, Ralph, Mercer

Markle, A. F., State College
Metzger, Dr. A. H., Millersville
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Peachey, J. H., Belleville
Patterson, L. A., Carbondale
Paxton, Geo. G., Houston
Patterson's Sons, R. P., Carbondale
Paxton, J. G., Houston
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Parry, Thos. L., West Chester
Page, R. Holmes, Paoli
Peters, Ulysses S., Slatington
Patton, J. S., Hartstown
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Raub, H. G., McDonald
Richert, J. H., Scranton
Reeder, M. E., Muncy
Rink, W. H., Johnstown
Randt, Henry H., Pipersville
Ridge, Dr. W. H., Trevose
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Shannon, R. F., Edgeworth Station
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Shaffer, S., New Castle
Scott, Lee R., Burgettstown
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Suter, W. T., Riverside
Sharpless, J. P., Londongrove
Stewart, F. B., Espyville Station
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Truxal, J. R., Greensburg
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Taggart, C. L., Washington
Throop, W. F., Espyville Station
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Wright, George B., Schwenkville
Worden, A. S., Frederick
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Woodmansee, J. E., Lake Como
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Wirt, John O., McVeytown
Weber, Dr. S. E., Lancaster
Waite, D. H., Warriorsmark
Way, R. Orlando, Warriorsmark
Walker, G. D., Salona
Westmoreland Agr'l Society, Youngswood
Wagner, W. F., Harrison City
Wells, Maj. Levi, Spring Hill
Wiley, W. L., Pittsburgh
Wise, W. S., Meadville
Wilson, O. N., Pittsburgh
Wyebrooke Grange No. 1306, Wyebrooke
Wilson, R. C., Newtown
Waugaman, J. A., Greensburg
Young, R. I., Middletown
Young, A. P., Millville
Yost, H. Y., Reading
Zook, John F., Belleville

Cups awarded to exhibitors of creamery butter, dairy butter, market milk, market cream and certified milk at the Thirteenth Annual Meeting of the Pennsylvania Dairy Union, Harrisburg, Pa., January 24-27, 1911.

PROCEEDINGS OF THE

# THIRTEENTH ANNUAL MEETING

OF THE

# PENNSYLVANIA DAIRY UNION

In Joint Meeting with the

# PENNSYLVANIA LIVESTOCK BREEDERS' ASSOCIATION

AND THE

# PENNSYLVANIA STATE BOARD OF AGRICULTURE

**HARRISBURG, PA.**

**January 24-27, 1911**

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H. E. VAN NORMAN, SECRETARY

Edited by A. A. BORLAND, Assistant

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Avil, J.
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D. R. Stephens - - - - - - Sayre, Pa.
H. M. Stokes - - - - - - Hanover, Pa.

## MEMBERS, 1910—NOT PREVIOUSLY PUBLISHED.

The following persons paid 1910 membership or contributed butter to the exhibit:

Avil, J. H.......... Glenloch
Cadwell, Garfield A.......... Meadowbrook
Dallas, J. W..........West Chester
Dolfinger, Henry..........Sixteenth and Tasker Streets, Philadelphia
Edken, Robert B.......... Westtown
Haines, W. H..........West Grove
Harris, D. J..........Corner Market and Water Streets, Philadelphia
Harris, D. J., Mrs..........Corner Market and Water Streets. Philadelphia
Hayes, C. E..........51 Greenwood Avenue, Trenton, N. J.
Henson, L. B.......... Coatsville
Jones, Wm. H..........Upper Darby
Jones, E. E.......... Harford
Keim, Wm. P.......... Pottstown
Keim, Leonard ..........St. Peters
Knoll, F. P..........State College
Larson, C. W..........State College
Lewis, H. W.......... Harford
Mallor, James P..........1408 West Second Street, Philadelphia
Maurer, F. H..........New Berlin
Sharpless, Joseph ..........London Grove
Snavely, H. A..........Willow St. P. O., Lancaster
Smith, R. L.......... Wawa
Stokes, H. M.......... Hanover
Stone, T. E..........Linden Street, Scranton
Swartz, L. H.......... Springford
Titus, Frank B..........199 West Owen Avenue, Lansdowne
Townsand, Prat. .......... Harford
Van Norman, G. T.......... Langhorne
Wesselgrave, W. W..........5113 Knox Street, Philadelphia
Williamson, E. C.......... Morrisville
Woolman, Edward N..........4709 Lancaster Avenue, Philadelphia
Woolman, Henry N..........4709 Lancaster Avenue, Philadelphia

## MEMBERSHIP LIST 1911.

The following persons have paid 1911 membership fee, or have contributed a tub of butter to the exhibit:

| | |
|---|---|
| Baldwin, W. C | Clifford |
| Blish, Otis | McCalls Ferry |
| Borland, Andrew A | State College |
| Brandywine, Dairies | Brandywine Summit |
| Brinton, J. H | Gap |
| Bringhurst, Joseph | West Chester |
| Brown, G. B | Pineville |
| Burkhart, J. N | Newville |
| Chamberlin, John | Parkesburg |
| Colonial Salt Co | Buffalo, N. Y. |
| Comfort, H. W | Fallsington |
| Critchfield, N. B | Harrisburg |
| Crowell, Preston | 824 Sixth Street, Harrisburg |
| Dewey, H. W | Sydney Center |
| Dodge, J. E | Narbepth |
| Donahue, G. G | 1907 Market Street, Philadelphia |
| Echoff, W. M | R. F. D. No. 2, Coatsville |
| Engle, S. G | Marietta |
| Erdman, A. H | Wiconisco |
| Erk, George | Seeleyville |
| Fletcher, A. W | Bedford |
| Foirey, H. N | 49 Jefferson Avenue, York |
| Gabler, B. F | Greensboro |
| Garbet, E. L | Lititz |
| Garret, Chas. J | West Chester |
| Gandrum, D. H | Muncy |
| Gaul, J. W | Miffintown |
| Guernsey Creamery Co | Guernsey |
| Hagerman, W. H | Milner |
| Hagerman, D. C | Milner |
| Hammill, Robert | Cochranville |
| Harman, T. D | Pittsburgh |
| Harris, D. J | Corner Market and Water Streets, Philadelphia |
| Harris, D. J., Mrs | Corner Market and Water Streets, Philadelphia |
| Harrington, M. J | Dushore |
| Henson, L. B | Coatsville |
| Hershey, J. N | Florin |
| Hershey Creamery Co | Harrisburg |
| Herr, J. Aldrus | Lancaster |
| Hoffman, Sellers | Chadds Ford |
| Holl, R. C | Bedford |
| Hollinger, C. E | Shippensburg |
| Huey, A. B | Lenape |
| Jones, E. E | Harford |
| Johnstown, Ezra C | Box 305, Alelgheny |
| Kellog, Dr. Thos | 1204 Pine Street, Philadelphia |
| Kendig, John R | Pomeroy |
| Knight, H. H | New Bethlehem |
| Knoll, F. P | State College |
| Lane, C. B | Philadelphia |
| Larson, C. W | State College |
| Leonard, Austin & Son | Troy |
| Lower, Mrs. Elmer E | Mechanicsburg |
| Marshall, W. D | Lyndell |
| Martin, A. L | Harrisburg |
| Maule, Edwin | West Grove |

| | |
|---|---|
| Maurer, T. H | New Berlin |
| Maxwell, E. B | Quarryville |
| Mott, O. D | Edinburg |
| Morse, S. E. & Son | New Milford |
| McClure, W. W | R. F. D., Downingtown |
| McCoy, R. H | 524 Forest Avenue, Avalon |
| McGranahan, W. H | Kennard |
| Norton, W. C | Waymart |
| Ott, Harry E | Wismer |
| Paxton, George G | Huston |
| Pencoyd Farm | Bala |
| Phillips, M. T | Pomeroy |
| Reichert, J. H | Scranton |
| Richardson, C. M | Burnville |
| Sellew, R. P | Mercersburg |
| Shoemaker, M. P | Greensburg |
| Sharili, S. A | Mercersburg |
| Sharples Separator Co | West Chester |
| Shrum, W. F | Jeannette |
| Smith, Horace T. & Son | Buckmanville |
| Snavely, H. H | Willow Street, Philadelphia |
| Spanniel, H. A | Kempton |
| Stokes, H. M | Hanover |
| Stuntz, E. H | Harrisburg |
| Stivel, H. H | Kumry |
| Supplees Alderny Dairy | Philadelphia |
| Titus, F. B | Lansdowne |
| Twining, F. M | Wycombe |
| Van Dyke, C. P | Knoxville |
| Van Norman, H. E | State College |
| Weld, R. J | Sugar Grove |
| White Horse Farm | Paoli |
| Willow Brook Dairy | Willow Grove |
| Winney, A. U | Thompsontown |
| Yost, A. H. A | New Ringgold |
| Yost, S. T | Myerstown |
| Zug, Ephriam | Prescott Station |

## CONSTITUTION OF THE PENNSYLVANIA DAIRY UNION

### Article 1.

The name of this organization shall be The Pennsylvania Dairy Union.

### Article 2.

It shall be the object of this organization to promote, protect, encourage, and develop the dairy interest of the Commonwealth by every means within its power.

### Article 3.

Any person, firm or agricultural organization interested in dairying may become an active member for the calendar year on payment of one dollar ($1.00), or may become a member for life on payment of ten dollars ($10.00).

Associate Members: Any agricultural organization that is an active member of the Pennsylvania Dairy Union may have its members listed as Associate members for the calendar year on payment of twenty-five cents ($.25) for each such member. Associate members shall not hold office or vote.

Any one rendering this organization noteworthy service, may by a unanimous vote at any regular meeting, be chosen an honorary member.

Honorary members need pay no dues, they may participate in business, but not vote nor hold office.

### Article 4.

The officers of this organization shall consist of a president, one vice president, a secretary, a treasurer, and six directors, all of whom shall be elected by ballot at the annual meeting, and shall hold office for one year. The president, secretary and treasurer, together with the directors elected, shall constitute a board of directors.

### Article 5.

1. The president, vice president, secretary and treasurer shall perform the duties ordinarily appertaining to those offices.
2. Between the meetings of the Union, the board of directors shall have the general management and control of the property and affairs of the organization, subject to the Constitution and By-Laws.
3. Four members of the board of directors shall constitute a quorum to do business.
4. The board of directors shall organize by the choice of a chairman, and a secretary, and may adopt such rules and regulations as shall seem desirable for its government and may appoint such committees from its own members or from the general membership of the Union as it shall consider desirable.
5. It shall be its further duty to decide the location and date of the annual meeting of the organization, and to make all necessary arrangements therefor.
6. No expenditure of the funds of the organization shall be made except by a majority vote at a meeting of the Union, or as authorized by the board of directors, and all bills shall be approved by the chairman of said board, before their payment by the treasurer.
7. The board of directors shall serve at each meeting as a committee on resolutions.

### Article 6.

Meetings shall be called by the president at such time and place as may be designated by the board of directors. There shall be at least one meeting of the Union each year.

### Article 7.

At any regularly called meeting, fifteen members shall constitute a quorum for the transaction of business, but a smaller number, not less than eight, shall have the power to adjourn to another date.

### Article 8.

This constitution may be amended at any annual meeting by a two-thirds vote of active members present, provided notice of such amendment shall have been given in the call for the meeting, issued at least a month previous thereto.

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*As amended Jan. 16, 1908.

# Joint Meeting of the Pennsylvania Dairy Union
and
# Pennsylvania Live Stock Breeders' Association

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## Proceedings of the Dairy Union

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Harrisburg, Pa., Jan. 25, 1911.

### ADDRESS OF PRESIDENT.

H. M. Stokes, Hanover, Pa.

The President—Ladies and Gentlemen: We are about to open the Thirteenth Annual Meeting of the Pennsylvania State Dairy Union. I would say to you that it is with a great degree of pleasure that I represent you in this, the thirteenth meeting. It has been my pleasure to be identified with the Pennsylvania Dairy Union for quite a number of years, and I full well remember that up to about five or six years ago, the Pennsylvania Dairy Union was carried on in quite a half-hearted manner. At that particular time, however, there was injected into our meetings a spirit that commenced to stir up a great deal of interest. This spirit was Prof. Van Norman, who has been very active and has added much to the interest of the dairy meetings. I remember full well about five or six years ago when he was called to the dairy meeting which commenced on Wednesday at 10 o'clock. We met in the Board of Trade Building. The rooms were cold; few were there; and, of course, the meetings themselves were not at all enthusiastic. But the following year a splendid meeting was held at Wilkes Barre, and I am pleased to say that from that time to the present we have had very enthusiastic meetings, meetings that have done the dairy men of this country a great measure of good and have been a stimulus to the dairy industry.

I wish to state to you that we want every one to help; we want everybody to be enthused; we want everybody to give his opinion. We want a general experience meeting, for by those things we learn and that is what we all wish to do. We want everyone to feel perfectly at home, and to feel perfectly at liberty to help in every way, shape and form. If you haven't a set speech and have only an idea to put forth, it is the idea we wish you to express and by so doing I know you will start a discussion from which we will all learn. Now, I want you to feel that each and every one is a member of this meeting and has a part to perform. Often times the very best and fundamental truths are given in the simplest language and we hope that every one will feel perfectly free to ask questions and to give his ideas. By doing so we will make this one of the most enthusiastic meetings we have ever held, and we will all go away from here greatly benefited. Each and every one's experience helps the other. It matters not what that experience may have been, and whether it is great or small. The important point is to help each other by giving that experience. Do you know that I oftimes think the longer we are in the dairy business the less we know, and I find by studying, by investigating and by getting other's opinions that sometimes the views I have always held are entirely wrong. There are not a great many of us here this morning, but I know that by each and every one trying to help, we can have a very enthusiastic meeting for the next two hours.

## PREPARATION OF CREAM FOR CHURNING.

### W. H. McGranahan, Pittsburgh, Pa.

Ladies and Gentlemen: I realize this is an important subject. I wish that I could do it justice and do you justice by giving you something new, something good, or something instructive to take home with you, but I fear that I cannot give you a great deal this morning. However, I will try to give you a few observations that I have made in my own dairy work. No doubt some of you will not agree with all the things I have to say this morning, but that is only natural. I think it is the exchange of ideas that will do us the most good. The good general debate which follows a subject of this kind really brings out the most truths and does the most good and makes us better dairymen and butter makers. So I will briefly give you a few of my ideas and thus get the subject started:

Preparing cream for the churn is, in my opinion, the most important part of creamery work. In no other part has the butter maker such a chance to get in his good work and to show his skill as at the ripening vat. My experience with that part of the labor is that you can teach a beginner to churn, to do the mechanical part, so that he can get a churning through that may score perfect body, salt and style and yet perhaps he has not commenced to comprehend the business of the ripening vat. Flavor is not made in the churn, but in the ripening vat. That is not just quite the idea I wish to convey, perhaps I should have said that the finishing touches to the flavor are put on in the ripening vat. Let me add right here that it is these finishing touches to the flavor that gets us up in the special class, and gets the extra two or three cents or whatever the increased price may be. At the present time the market demand for sweet butter, or butter churned from sweet or unripened cream, is so small we will not speak of it this morning, but confine the talk principally to ripened or sour cream.

There are two reasons why cream is ripened: First, and most important, to secure the flavor and aroma which are so characteristic of high scoring butter. The flavor and aroma are produced by the good ferments which are present in the cream during the ripening. Bacterologists and scientific investigators differ as to the specific group of ferments that produce these flavors.

The second reason for ripening is to increase the churnability of cream. We know that the buttermilk from cream ripened under ordinary conditions and churned at a medium low temperature should contain not more than one-tenth of one per cent. butterfat. However, the buttermilk from sweet cream under similar conditions will show up four times as much butterfat. A little saving in fat each day amounts to considerable in the course of a year.

The first step in the preparation of cream and the most important one is to secure good material. This is the hardest part. If we could only have milk and cream delivered at the creamery, sweet and clean, most of our troubles would be over right away, but unfortunately this is not the case. When once milk and cream has become off flavor and tainted, no butter maker, however skillful he may be, could make a gilt-edged product from it. It is just like a man trying to build a house out of bad lumber, rotten shaky stuff. He may be a good carpenter and do his work well, but when it is finished he has only a second-grade building. It is the same way with a butter maker trying to make fine stuff from tainted cream; he will have only an under-grade.

It is an advantage to get heavy cream. If milk is being taken in, adjust the separator to skim a heavy cream, say 35 per cent, or even higher, and if hand-separator cream is taken in, try to induce patrons to deliver as heavy a cream as possible. This will enable the butter maker to use a large amount of starter without making the cream so thin as to cause hanging in the churn. It will also save time, power, labor and ice on account of the less bulk. The butter maker will have less work and trouble to get cream churned, and again he will have a small saving of fat in the buttermilk, not because heavy cream churns out cleaner than thin cream, but on account of there being less of it.

A clean sanitary building, clean surroundings and a pure atmosphere are necessary for the proper care of cream. How often do we see old dilapidated creamery buildings with old tin vats, rotten wooden floors and little or no sewage. I am not much acquainted with conditions in the eastern part of Pennsylvania, but I know that in the west we have a good many such buildings. They were built years ago through the interest of creamery promoters, and were set up on posts a good deal like a corn crib. Those same creameries are in use today. That is probably a little off the subject, but I wanted to emphasize this point of a pure atmosphere that will not contaminate the cream. We should use well-made vats and utensils. I like to have the conductors open, if possible, so that we can clean them better, otherwise use sanitary pipes. I do not like to use these old iron pipes at all, and when putting up sanitary pipes I believe you want to use plenty of unions. I think a union every six feet is none too many, so that we can clean the pipe thoroughly. This pipe should be taken down every day, thoroughly cleaned and steamed and left down until needed the next day.

I believe in pasteurization, but when milk and cream are cared for in a proper manner there will be no need for pasteurization. I think where ripe ferments are handled the cream produces a good flavored butter, but cream as delivered to the Pennsylvania creameries today should be pasteurized. We should learn to think of the fat of cream not as a dead mass, but as the home of countless millions of organisms which may be our friends or may be our foes. If the butter maker goes ahead and ripens up cream in its natural state and the good ferments happen to predominate in that cream he will probably secure a good flavored butter; but if the undesirable organisms are in the ascendency on that day he will get an off flavor. This makes an ununiform grade of butter. We all know how butter buyers kick on butter that does not run even. I therefore hold that the best plan is to destroy these organisms by thorough pasteurization, and then to add a starter which we know contains the germs which we want. This will secure a uniform flavor in the butter from day to day, a matter which is of great importance. If we pasteurize our cream somebody may ask what will be the pasteurizing temperature? This seems to be a debatable question. Different men use different temperatures, all the way from 140 to 200, and back up their claims by the good scores they made by pasteurizing at a certain temperature. We are thus really at a loss to know what is best. My own preference is for a high temperature, at least 175 to 180. I like to compare the pasteurizing of cream with a farmer getting a field ready for sowing. A careful farmer will thoroughly harrow and cultivate his field and destroy all the weeds in sight. So will the careful butter maker pasteurize his cream. I believe that poor pasteurization is worse than no pasteurization. A temperature down to 125 one minute and then up to 200 the next will not give good results. I think such methods are like those of a careless farmer. He is harrowing to get over the ground and is driving a little wide and leaving strips of weeds here and there. I think low pasteurization leads more or less to undesirable organisms.

I prefer a pasteurizer that pasteurizes rapidly and a cooler that cools quickly. This I have found necessary to give body to the butter. This last summer we have used the new style ripener altogether, and experimented a good deal in trying to pasteurize the cream in the ripener, but we met with little or no success because the butter in nearly every instance was away off in body. It would not stand up. Understand me, I am not knocking the new ways; they are all right; I like them. I would not like to go back to the old vat to ripen cream, but I do say there are better ways of ripening cream for the churn than the new ripeners. After the cream has been pasteurized it should be cooled to 68 to 70 degrees. I think the ripening temperature is important. We have tried all temperatures from 58 to 75, but a temperature of about 68 to 70 seems to give us the best result. So I say, after the cream has been brought to 70 degrees, at least 15 per cent of good starter should be added. The starter should just be coagulated and contain about seven-tenths to eight-tenths per cent acid. I find it always well to mix the starter thoroughly by pouring it from one bucket to another before adding the cream; this will break up the starter and mix it with the cream. Then in about three hours, if the starter has been a vigorous one, you will find the cream to contain about four-tenths of one per cent of acid. If I am going to churn the next morning I now cool the cream down to 48 or lower. You cannot expect the development of acid abruptly. I have found by testing hundreds and hundreds of vats at cooling time and again the next morning that when you retain about four-tenths of one per cent of acid you will have five-tenths the next morning.

I would like to emphasize this point of not getting too much acid in the cream. I believe too much cream is over ripened. Butter churned from over-ripened cream seems to go off flavor sooner and get rancid. I have been told lately that the government, which was at work on the fish flavor in butter attributed it to this cause, over-ripened cream. I have long ago quit guessing how sour the cream was. I am using an acid test right along; they are simple, cheap and easy to operate. We have a number of good ones on the market. At home I use the Van Norman test. I have it on the shelf handy to the cream vat, and make a test in a very short time, less than a minute, and this stops all guess work.

I would like to add a word about cooling cream. If I were trying to cool cream in an open vat with ice and water around the jug, a process which we all know is slow, I would not hesitate to put a small amount of good artificial ice in the cream to prevent the acids getting ahead of me. Of course, this practice is to be condemned. It is only in the case of an emergency and we all know pond or river ice should never be put into cream under any consideration.

Now, I have not gone into the details of starter making. That would take too long, it is a whole topic in itself. Just a suggestion to beginners: Any one expecting to make a starter should secure the booklet issued by the manufacturer of the culture which you have decided to use, and study it well. Do not read it over once, but study it and get it almost by heart. It goes into the details thoroughly, better than I can tell you. Follow those instructions faithfully and good results are assured.

I would like to sum up the topic in just a few words: You must have good material; fight for it, if necessary. If you will pasteurize the cream and ripen it with a good starter in a clean sanitary building, a deliciously flavored butter will surely result.

I thank you.

The President: Members of the Dairy Union, this is a very important subject, and I would like very much to hear some discussion on the manner of ripening cream. I think it is one that interests us more than most other subjects. Now, I would like to hear someone else give their experience in this matter of ripening cream. In the matter of pasteurization of cream, I believe that the government is making experiments. We have some men here today and I am going to do some drafting if there are no volunteers. I am going to draft a gentleman who has had a great deal to do with the selection of butter for the United States Government. I am referring to Professor Larson, of State College. Professor Larson, what have you to tell us on that subject?

Professor Larson: I can only second the remarks of Mr. McGranahan. I think he has given you a very good description of it. It is unfortunate that we have to consider the bad cream. If we had all good cream it would be all right, any of us could make good butter. But we do have bad cream and the best butter maker nowadays seems to be the man who can make the best butter out of bad stuff. When we have bad, sour, over-ripe cream, we must pasteurize it and then we must get it on the market as soon as possible, and we must churn it as soon as possible after it gets into the creamery. I think one of the greatest mistakes of Pennsylvania butter makers is that they hold cream too long. They get it in bad shape and then make it worse. I believe if they would pasteurize it at once and make it into butter at once, they would improve the quality of their butter materially.

As to the pasteurizing temperature: I think Mr. Granahan gave you about the right course. I think it should be at about 175, but when you have sour cream sometimes you have difficulty in pasteurizing it. This can be slightly overcome by insisting that the patrons bring thicker cream. At least thick cream will keep better than the thin cream and besides that it will be easier to pasteurize. The thick cream, if it is sour, is very difficult to pasteurize.

That, I believe, is all I have to say, unless there is some question.

The President: Do you think it is better to hold it after it has been pasteurized? Do you have any experience along that line?

Professor Larson: The President asks about quick pasteurization and holding. I have no definite information as to that. I do know that at the contest in Chicago, the judges criticized a great deal of butter for having an undesirable flavor that they claimed was due to holding pasteurization, that is, by pasteurizing in the ripener. They claimed that this undesirable flavor was not found in butter pasteurized with the ordinary continuous pasteurizer. If you heat the cream high enough, 175, I believe continuous pasteurization will give good results.

The President: Anything further to be said on this interesting subject? I really think that the Pennsylvania dairymen or Pennsylvania butter makers have more to contend with in this matter of getting the cream in an improper condition and then trying to make a good grade of butter out of it than with any other single thing. I do not believe that you can make a good grade of butter out of cream that is not ripe. There may be a possibility of improving it some. I would like to hear someone else enlarge on this matter. Is there anything further to be said? If not we will go to the next topic.

## LEAKS THE CREAMERY MAN CAN PREVENT.

### B. D. White, Dairy Division, Washington, D. C.

Mr. Chairman, Ladies and Gentlemen: I can assure you that it is a pleasure for me to be with you today. I say this for two reasons: First, because I promised to come to your meetings for the past two years and failed to appear, and, second, because it affords me pleasure to meet the creamery men of the State of Pennsylvania. Now, with your permission, Mr. Chairman, I would like to reverse the two topics upon which I am to speak. You will notice I am on the program this forenoon and this afternoon, and if you will permit it I would prefer to discuss the "Creamery Leaks" this morning and "Market Conditions" this afternoon, unless there is some reason why I should not do so.

The President: You may choose either topic.

Mr. White: I will try to make myself heard, although I do not believe that I shall be able to be heard distinctly on account of the feet shuffling on the floor above, but if you do not hear me, just speak out. I believe it will be a good idea to have you come in a little closer, not only for myself but for the speaker who follows. There are some chairs in front here.

The President: I would be very much pleased if those who are in the rear would come closer and take the seats in the row up front.

Mr. White: I want to say further that I am not here for the purpose of delivering an address. All I hope to do is to get up a discussion. There is more good comes from a discussion than from the long talks or long papers. Therefore, I am going to touch on a few points that will interest you and hope that you will start a discussion. I also wish to say that I want you to feel at liberty to stop me at any time and ask questions. Because if you should wait perhaps it will slip your mind or you will not think it right to ask it afterwards.

The subject, therefore, this morning, will be "Creamery Leaks." If we go back a few years and consider the development of the creamery industry of the United States, we can readily appreciate why some creameries are operated in such a slip-shod and hap-hazard manner. Now, that is pretty plain talk, isn't it? I believe that the losses sustained by a large number of creameries are due largely to the fact that creamery men have not had an opportunity to associate with their neighbors and talk over matters of importance and solve some of these questions. The leaks in some creameries are so large that the entire creamery leaks away, so to speak. The creamery, of course, does not disappear, but the money that may be in the business disappears, and sometimes it is necessary to close the creamery on account of such leaks. I say sometimes. I have seen many creameries fail because of the leaks. I want to say further that I believe that nine-tenths of the creameries that have been closed were closed because of mismanagement, which is no more than a leak.

I have made a few notes to aid me, and in order to make this as short as possible I will try to get right down to business. It does not make any difference what leak we take first. There are so many of them that when we get through we will have a whole lot of them and some pretty large ones. We will start first at the weighing can, assuming that you are receiving the milk and the cream at the creamery. Often we find there a very serious leak on account of the old, worn, rusty and inaccurate scale. I can tell you a little experience along this line. When I was making butter we tried to keep a record of the overrun. We knew what it ought to be, but finally the overrun dropped. There apparently was no cause for such a drop. We examined everything but the right cause, and that was the scales. We were using a five-beam scale and finally found that on the bottom of one of the weights numerous holes had been bored at the factory, and some of them were filled with lead. The holes were bored for the purpose of balancing the weights, or getting them the right weight. Sometimes they were bored too deeply and had to be filled up again with lead. One of those lead fillings dropped out and made a difference of three or four pounds on each weight, and you can realize what the result was. Now, the way to overcome this is to have at your creamery a fifty-pound weight, which is supplied by the manufacturer and which you can use to adjust your scales. This is commonly called a test weight.

Now, that was one leak, and there is always a possibility of such trouble. The next leak, I believe, is in the taking of the samples. Different methods are followed. I believe the one usually followed throughout the country is to dip out from the weighing can a sample for composite test. This perhaps is about as accurate a way of taking the sample as I know of, but the sample should be taken immediately after the milk is poured into the weighing can. We have had difficulty where the buttermaker weighed the milk, set the figures down on the milk sheet and then took the sample for the composite test. During the very short time the cream had commenced to rise to the surface and the buttermaker skimmed off a heavier or a larger proportion of cream than he ought. That is also one of the leaks.

Now, if you have haulers—are there any cream haulers in the State of Pennsylvania, Professor?

Professor Larson: Oh, yes, lots of them.

Mr. White: If there are not I was going to omit that, but if there are, I am going to discuss that for a moment. I believe that there is considerable loss sustained to creamery men where they have creamery haulers. I also believe there are very few creameries operated at the present time where the haulers are properly checked up. In our work we have found creameries losing several thousand dollars per year on account of the haulers not taking accurate samples or on account of their dishonesty. We have found instances where a hauler had a good many relatives on his routes. The patrons were all very well satisfied with the hauler and they had good reasons for being so. When we checked up we found that he had given them better weight than they were entitled to, and that he was also taking a sample of the cream immediately upon his arrival at the farm without stirring the cream. The sample was taken from the top. Now, this can be obviated by checking every single hauler. How? I assume, of course, that the creamery haulers in Pennsylvania are given jars in which to fill the sample, and the haulers also weigh the cream. When the hauler arrives at the creamery the cream should all be weighed and a composite sample taken from such cream and tested. This, of course, will give you the total pounds of butter fat and the total pounds of the cream; then you test each individual sample the day it arrives. Now, do you all do that, or do you make a composite of the samples as they are delivered by the cream haulers? If you do, I believe you are following the wrong method. I believe it is absolutely necessary to test every sample of cream each and every day. Therefore, if you do test it every day you must compare the pounds of butter fat you have to pay for with the pounds of butter fat that the hauler has delivered, and if there is a shortage, of course, you know where it is. Now, if you receive cream I would like to ask what is the practice of receiving and weighing such cream at the creamery? Will some one tell me. We can make a good deal better headway if someone will explain whether the cream is poured into a weigh can or whether the individual can is weighed, or what is done.

Mr. ———: With us it is weighed right in the milk can.

Mr. White: In the same can in which the milk is weighed?

Mr. ———: No; in the same can the cream comes in.

Mr. White: I see, in the individual can. I believe that is preferable in all cases unless the hauler is provided with cream-carrying cans. Those, of course, may be emptied into a receiving can at the creamery. However, this should only be done after the milk is weighed and the can thoroughly rinsed out. Now, if the individual farmers bring in or send in the cream in their own cans it would not be advisable to pour the cream into the weigh can for the purpose of weighing. It would be best to put the can and all upon the scales and weigh it and subtract the weight of the can and give the man credit for what cream he has.

Mr. ———: Why is that?

Mr. White: Because if you were to pour the cream from the individual farmer's can into the weigh can, it would first necessitate rinsing the can for the purpose of getting all the cream out, and you would also have to rinse the weigh can. For instance, if a farmer drove up to your creamery with cream that tests fifty per cent, a considerable portion of it would adhere to the weigh can unless it were rinsed out, a method which requires too much work, and perhaps dilutes the cream with water too much. Now, if the practice of weighing the cream in the weigh can is followed, the next man who drives up may be having cream testing only twenty per cent. That would be poured into the weigh can and would rinse out the amount left in and the second farmer would get the benefit at the expense of the creamery. I would not advise using the ordinary scales for weighing the cream in the individual farmers' cans. I would provide a more sensitive and more delicate scale for that purpose. Too often we find where the cream is weighed on a large scale there are errors, and very often the loss is at the expense of the creamery man.

Now, in reference to keeping the samples: I do not believe it will be necessary for me to touch upon that a great deal, but we have found much difficulty in the creamery men getting accurate samples from the composite test. We have found in some cases where milk is kept for one month, or even for two weeks, that the covers were not tight on the jars, and the result was a considerable evaporation of the moisture in the milk. This would make the reading of the butter fat higher than it ought to be, or in other words the creamery men would pay for more butter fat than they received. I remember one instance in particular where the butter maker did not receive any overrun at all and wrote for assistance. We went to help him out and found that he had his test jars placed in a rack above a steam radiator. The weight of the bottles on the shelf pressed it down to such an extent that he could not get the bottles in with the covers on. The result was, the covers were left off and of course you can realize the evaporation that took place in those samples. He lost at least twenty per cent.

Now, we will proceed one step farther, and we will go to the taking of the samples for testing. We found a great deal of trouble in some States to secure accurate pipette for testing. You have a law here on that subject. If you do not, how do you know that you are getting from the manufacturers an accurate pipette? You don't know, do you?

Mr. ———: No, we are apt to get poor glasses because the other States have the laws.

Mr. White: Absolutely true. In other states there are laws compelling the use of accurate glassware and they receive the best and the poor is passed on to the states where there are no laws. Therefore that is a point for you to consider and correct.

Now the test bottles; they are another source of leak. Not so much with milk bottles as those intended for cream. We find that the milk bottles are fairly accurate. The cream bottles are very, very inaccurate, as a general rule. Now why is this? In the first place, there are so many different kinds of bottles made that no creamery man or no agricultural school can require the glass manufacturers to send bottles that will conform to any specification. Isn't that true? There are no specifications at the present time for cream bottles. Neither are there for milk. Now I want to say here that this ought to be corected as quickly as possible and an effort be made—and by the way Prof. Larson and Prof. Van Norman you can do a great deal to help this mater along. I have said an effort is being made to prescribe a certain specification for milk and cream bottles. This will be done in co-operation with the dairy instructions and the bureau of standards.

Prof. Larson: We have sent our recommendation and specifications.

Mr. White: You can go farther than that. Get after the committee and get an action from them. Get them to meet. They have been a little slow along that line, because this is a matter which is so important to the creamery men. You can never tell what kind of a bottle you will get from the manufacturers and yet it is possible for them to make bottles that are absolutely accurate. I would advise discarding all the six-inch fifty per cent bottles immediately. The best way to get rid of them I believe is the way a certain man advised at a meeting sometime ago. He said to take all the six-inch fifty per cent cream bottles, set them up in a row, a straight row as nearly as possible and then get your shot gun out and see how many you can break at a time. Now those bottles are not fit to be used by any creamery man. There are some bottles fairly accurate. The nine-inch thirty or fifty per cent bottles are pretty accurate and the nine grams fifty per cent are quite accurate but not accurate enough for every day practice.

Prof. Larson: What would you use then if they are not accurate enough?

Mr. White: At the present time the only thing that you can do is to use what there is on the market, but we hope that the dairy authorities will get together and push the thing through and ask for the standard bottle, or prescribe specifications for a bottle, and then require the manufacturers to make them according to specifications.

Prof. Larson: Would you recommend a fifty per cent nine inch bottle or thirty and fifty per cent six inch bottle?

Mr. White: The thirty and fifty per cent nine gram, yes, or the nine-inch, thirty or fifty per cent. The nine-inch cannot be used in the ordinary test. Therefore, many creamery men have not felt that they would like to go to the expense of buying a new tester and yet it would be money in their pockets to do so.

Mr. ———: That is for cream; what would you use for milk?

Mr. White: The ordinary bottle used at the present time. It is graduated to ten per cent. It is not necessary to have ten per cent bottles for testing milk. I do not believe you have ever seen milk test ten per cent. The eight-inch bottle is much better because the graduations are farther apart and you can read the test much more closely. Some are graduated only six per cent in which the graduations, of course, are still farther apart and you can make closer readings. If there is any danger of going above six per cent, of course, you could not use those. I have found a good deal of trouble with the mouldy samples, during the summer months when the composite samples are kept for two weeks or one month. This is expecially true where the tin top jars are used. If you prefer the tin tops, I would advise you to paint the under side of them with a good quality of paint before you use them. Such paint perhaps will last for a year or longer, while if you would use the new tops they would rust the very first month. The second month you will find rims of cream and mould mixed and it would be diffcult, or impossible rather, for you to dissolve the mixture and get a good sample. Leaky vats also cause leaks in the creamery and perhaps some of you have had expereince along that line. I know I have had, especially with the open vat which had water around the sides. Sometimes a large amount of water is run underneath the vat and will lift the vat up. Sometimes the vat breaks away from the tin and causes a leak. Very often we find pin holes in the tin Therefore, copper is much better for cream vats than tin. In fact I would not purchase a milk or cream vat made of tin. I would demand copper of a good heavily coated with tin.

One of the leaks is the separator out of balance. Invariably when the separator vibrates you can feel reasonably sure that it is not doing close skimming and it ought to be attended to as soon as possible.

A leaky churn perhaps is one great fault at the creamery. The cork around the cover comences to leak a drop or two one day and the next day a little more, and the next day still more, and so on until the butter maker becomes so used to seeing a few more drops leak out every day that he does not think it amounts to anything. Yet before he knows it, he may lose a quart or two quarts of cream a day.

The improper reckoning of cream is also a leak, as has been explained to you by the gentleman who preceeded me and I will not go any further with that.

The churn's running too slow is a serious difficulty in many cases and causes a great loss. The ordinary combination churn ought to run about twenty-eight revolutions per minute. If you run it very much slower than that it takes too long to churn and the buttermaker is apt to hasten the process by warming up the cream, and the result is that a large per cent of fat is lost in the buttermilk. We have saved from two to four-tenths per cent fat lost in the buttermilk by speeding up the churn to the proper number of revolutions.

Too thin cream is also a loss. We find a good deal of trouble with thin cream where farmers have hand separators. They seem to be of the opinion that they get a higher per cent, or I will put that in some other way; they seem to be of the opinion that they get better results if they take a thin cream than a thick cream. Now, this is all wrong, a creamery man will lose more in thin cream than thick. Besides that, the farmer is sending his skimmed milk, or part of it, to the creamery, which he ought to keep at home and feed to his stock.

Defective thermometers also cause losses. We have found in some cases that the buttermaker was using a theremometer that was inaccurate, perhaps 10 degrees out of the way. In some cases the buttermaker churned the cream at a temperature of 65 instead of 55, and lost very heavily in the buttermilk. Now, in this State you are making a great many prints. Perhaps most of your butter is put into print form, and we have found many losses by having prints over size. That is especially true in the smaller creameries. I cannot say that for some creameries, because in some places we find that the print only weights 14 ounces. However, I am glad to know that in this State you have a law to compel the creamery man to put out full pound prints.

We also find some trouble by over reading the tests.

I have received a good many letters from creamery men stating that they wanted to satisfy the patrons and therefore gave them one and two-tenths per cent more than the test actually showed. Now, I believe that this is a wrong practice, because the farmer does not know that you are giving him more than you ought to and he does not appreciate it. There is no reason why he should know, or why he should receive it. Now, if you want to give the farmer something, why not give it on the price, or why not give him a premium. Let us assume an example: Supposing a farmer delivered to your creamery 2,000 pounds of cream in a certain month and it tests 25 per cent. That is 500 pounds of butter fat, isn't it? Now, if you over-read the test two-tenths of one per cent that will be 10 pounds of butter fat, will it not? If that is worth 30 cents a pound you have given the farmer $3.00 more than he is entitled to. If you want to be good to the farmer why not give him an absolutely accurate test and credit him on his statement "premium $3.00." He will know then. So will you know what you are doing. If you follow the practice of raising a test it will throw your work out of line and you cannot check up your work. If you are low on over-run you will say, or the buttermakers will say it is because we give a higher test. That may be true to a certain extent, but it may not be the only reason for your overrun, and the only way I know to operate a ceramery is to give everybody just exactly what he is entitled to, and no more and no less. Then you can keep records.

Now anotehr loss is the leaky condition of butter. This is due largely to high temperatures. We find in a considerable portion of the butter going on the market during the summer months this trouble of leaky body, or in other words, the butter does not hold the moisture. The moisture is not distributed in the right way for the butter to hold it. The moisture may be low and yet the butter is not in condition to hold it.

Tubs not properly prepared also cause a considerable loss. Now I say not properly prepared. What would we consider proper methods for preparing tubs? There are just two methods that I would advocate. Now if you do not agree with me in any of these things I want you to speak out at any time. One method is to soak the tub. How? By having a tank large enough to hold one day's supply of tubs. This could be filled with distilled water, which can be drawn from any steam pipe. If you use water from the well it will soon become stale. Now this water should be saturated with salt and the water should be put in with the tubs. They should be soaked at least 12 hours. Tubs prepared in this way will be soaked uniformly through and through; if the ordinary method is practiced of setting the tubs out on the floor and filling them with water in the evening you know what the result is. The next morning, when you arrive at the creamery, some tubs are empty entirely, some of them perhaps did not leak any. Now, those that are empty did not absorb as much water as those that are half filled. Those that are half filled did not absorb as much water as those that are full. Consequently if you put butter into those tubs, those that did not absorb very much water will draw the moisture from the butter, even though the tub is lined with parchment paper. Not only that, but if you ship this butter to the market there will be a great difference in the weight of the different tubs and the probabilities are that you are going to be the loser. There used to be a method used on the market by a good many commission men of adding eleven pounds for the tub. If you have a tub that weighs less than 11 pounds, of course, you are going to lose, therefore we advocate soaking the tubs until they will weigh at least 11 pounds. Another practice that is demoralizing is to put the butter into a tub without any record of the amount, or in other words, to fill the tubs full and send them to the market and depend upon the commission men to tell you what there is in those tubs. I am glad to see a change along this line. Many creamery men are at the present time weighing a definite amount of butter into each tub. You perhaps know the way the butter is weighed in the market. A commission man puts a tub on the scale, we say a 60-pound tub, and the tub will weigh 11 pounds, therefore 71 pounds ought to be the gross weight. If it weighs 70 pounds strong he will be paid for 60 pounds of butter. However, if it does not weigh strong the weight is put back one pound because the commission men's scales are not graduated to ounces, only pounds. Therefore you may only be one or two ounces short and yet you lose a pound. Therefore, I will repeat again, that the creamery man ought to weigh a definite amount of butter into each and every tub in order not to have it deviate from day to day or year to year. There is no other article that I know of that is put up the way butter is. You can buy a barrel of salt, or coal, or lime, or anything else that you please, you will find a definite amount in the barrel or package of any character whatsoever, yet the creamery men have followed the practice of filling the tub regardless of how much there is put in. Therefore, there are a good many things along this line—

Mr. Larson: Mr. White, many of our creameries in this State are not packing butter in tubs, but are putting it in prints; what have you to say about that loss.

Mr. White: I just mentioned prints a short time ago, professor, and stated that there was loss in some cases by having the prints too large, but in many creameries that is not the case, but in this State you have a law compelling the creamery man to give full weight, and on account of the peculiar condition in the Philadelphia market you must have a print that is dry. Therefore, you cannot wrap the butter with wet paper. We may get to that a little bit later.

Now, I want to say just a word about keeping records. It has been only a few years since creamery men have attempted to keep records of any character whatsoever. As I started out to say, I do not know of any business that is run on such a poor business basis as a good many of our creameries. Now, I want to read to you for an example, and we have many of them, a letter that we received from one of these creameries. This gentleman says, "In reply will say we have not a set of books except our own make, and find it impossible to make any kind of an intelligent report, and never know what we are doing until the end of the month. We know this, however, that we paid $4679.41 all told, and are in arrears with our bank for several hundred dollars."

Now, there isn't any reason why a man should be in arrears with his bank without knowing what he is doing. Now, here is a creamery man doing a large business, receiving milk and cream, making butter and shipping it to the market and has scarcely a record. He has only a shipping book and a sort of cash book in which he has a report of the amount of money he has received from the commission man. Now, this was a co-operative creamery. I believe you have some co-operative creameries in the State of Pennsylvania, and as a general rule they are not operated in as businesslike a manner as those owned by individuals. However, I am glad to state that there has been a wanderful improvement among the creameries along this line in the past few years. If I were operating a creamery I would insist upon the buttermakers keeping a daily record. I would want to know from him the pounds of milk, the pounds of cream received every day, the test of the same, the pounds of butter fat received and what was done with it. I assume that some of your creameries in this State ship a considerable quantity of milk and cream. We have found some creameries where they have a contract to ship cream testing a certain per cent. In one instance of which I remember, a creamery had a contract for 20 per cent cream. Upon making a test of the cream that they had prepared ready to ship we found that it tested 26 per cent, and that meant a loss to the creamery of six pounds on every hundred pounds of cream shipped out.

Now, I believe it behooves the creamery man to know precisely what he does with every pound of butter fat he receives. If it is made into butter and shipped in the form of milk or cream, he should be able at the end of the day to know what he did with it, and at the end of the month he should have a record showing precisely what has been done. Now, some of you perhaps might say this is too much labor. Is is not,—it is merely business, and the creamery men must inject business into their work as is done in any other line of work.

Now, I want to speak to you just a few moments about overrun. I understand that you have had some discussion in this State in reference to that subject, and maybe we can get up another discussion. The question of overrun has puzzled a great many creameries. A few years ago we requested the creameries of the United States to send us monthly reports and we were astonished to see the actual conditions that prevailed in most creameries. They did not know what per cent of overrun they were having and in many cases they did not know how to figure the overrun. Now, I am going to tell you right off-hand what I believe is a fair overrun. If you do not agree with me I want you to say so. In the whole milk creamery we believe the overrun ought to be 18½ per cent; in the gathered cream it ought to be 21 per cent. Now, this allows for 14 per cent water, about 3 per cent of salt and 1 per cent of casein. If the testing is done accurately you lose only one-tenth of one per cent in the skimmed milk, which is too high. However, this permits of one-tenth per cent loss in both the skimmed milk and in the buttermilk, and you can get the overrun mentioned. If you do not get it, you can make up your mind there is something wrong. Now, this is for salted butter, not for unsalted butter. With unsalted butter the overrun would be about 3 per cent less.

Mr. ———: Would that mean butter in tubs or printed butter?

Mr. White: It does not make any difference, butter in tubs or prints. Printed butter can be made to hold out by very careful work. That is especially true in other cities than Philadelphia, where they demand, as I said before, a dry wrapper. In New York and other States they do not care for a dry wrapper and consequently you can soak the wrapper and make the weight hold out. In other words the wet wrapper will not draw any moisture from the butter. In places where you make butter for Philadelphia and must use dry wrappers, they will draw some water from the butter. Personally I prefer to wrap the butter in wet paper. The butter comes out much better than when it is wrapped in dry parchment, but I do not want to say one word against the Philadelphia methods, and if you are shipping to that market, I would advise you to make the butter the way they want it, and not what suits your own convenience. If you can do better, of course, it is your privilege to sell it wherever you can do the best.

Now, I will answer the question why you should get a higher per cent of overrun in gathered cream than whole milk. In the whole milk creamery the creamery sustains the loss of skimming the milk and whatever per cent of fat there is lost in the skimmed milk is paid for by the creamery. In the gathered cream the farmer skims his milk on the farm and he sustains the loss himself.

The President: Don't you think the loss sustained by the creamery in churning thin-gathered cream, instead of heavy cream, would offset the gain from churning farm skimmed cream?

Mr. White: Yes, in a good many cases. I am glad you brought up that subject of thin cream. There is no valid reason why the farmer should send thin cream to the creamery. We have endeavoerd to investigate this to some extent and find one of the principal reasons for thin cream is that the creamery man often is not careful enough in rinsing out the farmer's can and sends it out with some cream in it. That, of course, would be objectionable to the farmer and is not right.

Recently creamery men have endeavored to correct this trouble by having a small, clean receptacle or a jet of steam over which the can is placed. The steam mingling with the water will rinse out all the cream which in turn drips into a receptacle underneath. The can is thus returned to the farmer clean without any heavy cream adhering to it. Therefore, this method will do away both with the argument of the farmer and the cream that was left in the can.

I did not suppose there was a creamery in the State of Pennsylvania where cream was still measured with the pipette. If there are any creamerymen here who are still following that method I would advise them to order a scale before they go home and on the first day of February start over again in the right way. You cannot get accurate results by measuring the cream for testers, and, by the way, if you order a scale, order one that you can depend upon. A good many creameries have purchased a $4.00 cream scale and found that they could not get any more accurate results than they could by measuring. Then they condemn the weighing system, but if you have an accurate scale, which costs only $15.00, you can weigh the samples of cream and give the farmer what belongs to him, and give him satisfaction and satisfy yourself.

Mr. Smith: I would like to ask in regard to thick cream. When a farmer churns his own cream is it to his advantage to have thick cream?

Mr. White: Yes, but we had better establish what a thick or thin cream is first. Let us take a basis of 30 per cent cream as a reasonable thickness, 30 or 35. Does that answer your question?

Mr. Smith: Yes.

Mr. ———: Suppose you had a cream that tested 20 to 22 per cent, would there be any noticeable difference in the test if the cream was measured with a pipette instead of being weighed?

Mr. White: The difference would be slight, with cream testing between 20 and 22 per cent. However, in your method of mixing a cream you may incorporate a certain amount of air, and if you do, of course, you do not get the proper weight of cream by using a measure. In weighing, it does not make any difference how much you agitate the cream; you could always get the accurate weight. Therefore, even with 20 or 22 per cent cream it would be decidedly advisable to weigh it. I have made some tests of 20 per cent cream and I could not read any difference. They were both about the same.

The President: I found little practical difference in 30 per cent cream between weighing and measuring; I have tried it many times.

Mr. White: There is. Careful tests have been made in the laboratories; I do not know that I can recall them now, but there is quite a little difference; it seems to me that there is something like two or three-tenths per cent difference in 30 per cent cream between weighing and measuring. Why, it is reasonable to believe that there should be. The specific gravity is so much different and the weight is so much different. Now, let us apply that in a larger way: Ten gallons of cream that tests 20 per cent will weigh about 83 pounds. I believe it is 83 and 3-10ths. Cream that tests 25 per cent will weigh only 81 pounds or there would be two pounds difference to the can. The richer the cream the less it will weigh. Now, in the every-day practical creamery I don't know that it would be advisable to take that into consideration, but the fact still remains that there is that much difference, and enough difference between weighing and using the pipette that it would throw your work all out of line and you would not be able to keep track of it.

The President: Understand that I am not an advocate of measuring. I am an advocate of weighing, but in my tests I have found little difference until you pass the 30 per cent mark. I do not mean to say that 31 would make the dividing line, but when you get rich cream I find measuring and weighing make great deal of difference. Up to 25 per cent cream I have found very little difference; from 25 to 30 more decided; and from there on up quite a difference.

Mr. White: What kind of bottle did you use in making those tests?

The President: I will state that I have an intsrument to test the bottle. I used a bottle that I tested with this instrument, which was furnished by one of the dairy firms; I could not tell you which one, but the instrument was guaranteed to be accurate, and I did find by trying that same glass that was sold to me that the bottles were absolutely correct.

Mr. White: Even then you would use that instrument; what was it?

The President: Simply the neck.

Mr. White: It displaces the amount that ought to be in the fat. That is not the only thing to be taken into consideration, but by the use of that you may feel that you are getting nearly accurate results. Let me ask again what size bottles did you use—six-inch?

The President: Yes, six-inch.

Mr. White: Fifty per cent?

The President: No.

Mr. White: Thirty per cent.

The President: Yes, and with heavier cream than that I would take nine drams.

Mr. White: Even with those I doubt very much if the experiment—

The President: Would bear out on account of the glassware?

Mr. White: Yes.

The President: Then we are up in the air?

Mr. White: Yes.

Mr. Granaham: I would like to ask you in a test of cream, where there is a well-defined meniscus, where we should read the bottle?

Mr. White: How to read the meniscus or the top of fat column in the cream bottles? Various authorized works, such as Professor Farrington's, give different directions. They have issued 18 editions of their book on testing. The first 17 issues of it say we are to read the butter fat column from the extreme top to the bottom. A large number of creameries throughout the United States, of course, have those books in their creameries and use them and follow them very closely. However, the eighteenth edition tells you to read from the bottom of the meniscus to the bottom of the cream line or, in other words, to eliminate the curve entirely. Now, that will give you better and closer reading than if you read to the top. If you read to the top you are going to be the loser all the time. You will give the farmer more than he is entitled to. Webster and Gray made some experiments on this subject, reading four-fifths plus two-tenths; but that is too complicated for the ordinary creamery man, and Professor Farrington advocates reading from the bottom of the meniscus as a general proposition; that is nearer right than anything else we have heard of.

Mr. ———: Would you do the same for milk?

Mr. White: No, not for milk, because the neck of the cream bottle is so much larger and the meniscus is so much greater.

Now I see a gentleman here that is on the program and he should have taken the floor when I took it. I don't want to encroach upon his time, and therefore will leave the floor unless there is some question.

Mr. Marshall: How would you prevent leaky butter?

Mr. White: That is a good question. I am going to tell you this in as few words as I can. You must get your temperature down to where the water is distributed throughout the butter without leaking out.

The cause of leaky butter is either too much water or water not properly distributed, and you can regulate that largely by churning at a lower temperature. I want to say further, that a pasteurized cream will not show these conditions as much as raw. In the raw cream the butter fat globules are in clusters and consequently there is more place for globules of water. In pasteurized cream the clusters are separated and each globule is by itself and you can incorporate the water, or the water wil lbe distributed more evenly through these globules than through the clusters.

I am very glad to have this pleasure of being with you, and I want to apologize for not being here last year and the year before. I did not expect even to get another invitation to come to the State of Pennsylvania, because I had disappointed you twice, but Professor Van Norman seems to stick to a proposition with particular tenacity and wrote me for the third time, and I replied that I would not disappoint him this time. I thank you for your attention.

The President: I want to say that is the best practical address I have heard in a dairy meeting. I do not like to say that, but I have to be honest in my views, and I say that it is an address that came from one who knows. You have been in a creamery in your time, and worked in a creamery and know what you are doing. I have noticed very particularly when a certain question is asked you about some of the things that are pretty intricate for us to find out for ourselves you understand what we want to know and in good language tell us quickly what we want to know. I thank you very much for the address, it has been very interesting.

Mr. White: I want to thank you for the compliment.

The President: Not at all, it was deserved or you would not have got it.

The President: Ladies and gentlemen, I am pleased to introduce Mr. Slater. He has done a great deal toward the betterment of the butter situation in Minnesota. They tell me he is another practical man, so get your questions ready. The subject that Mr. Slater will address us on will be "The Oleo Situation." That is a fad of Mr. Slater's, I understand.

## THE OLEO SITUATION.

### E. K. Slater, Sec. National Dairy Union, St. Paul, Minn.

It is not only a fad but a hobby, and when you see a man riding a hobby around you know he is keeping himself pretty busy. We have different hobbies, but they all have their uses. I am sorry that I had to make the President disarrange the program, but I am glad to be with you today. I can bring to you, I believe, without fear of getting myself into trouble, the greetings from the dairymen from the West, and you can make that cover just as much territory as you wish to; I can bring to you particularly the greetings from the dairymen from Minnesota. I am not going to attempt to tell you here today how good a State Minnesota is, or anything of the kind. It is a mighty good State when you get down to it. It is quite a ways down to it just now; it is covered with a whole lot of snow. We turn out some mighty good men in Minnesota. I am not a Minnesota man, so don't misunderstand my remark. But Ben White, your former speaker, is a Minnesota man. I just want to say Amen to what the President has said. I know him and know of him for a good many years. This is a little arrangement White and I have made between us, but don't let it detract from the force of the remarks I am making. He would probably have said something good of me if he had thought of it.

Mr. White: You don't know but that I did, you were not here.

Mr. Slater: I imagine probably this oleomargarine question is a live one with you. As your President has said, it is a hobby with me. I am giving my whole attention to the question, attending all the dairy meetings I can and in my humble way explaining the things that the dairymen stand for. If you will give me about 20 minutes of your time I will outline to you just what the National Dairy Union is attempting to accomplish. At the present time it is attempting to accomplish only the education of people as to the real issue that is before the people in this oleomargarine controversy. I assume that every person heer this morning knows what oleomargarine is. I have been giving it a good deal of study and if you were to ask me what oleomargarine is I would not be able to give you a definietion. It is just whatever happens to be the result of the mixture of fat and oils from different sources. The conglomeration is colored yellow and called oleomargarine, that is when they have to call it oleomargarine; it is called butter under all other circumstances.

In order to make myself perfectly clear here this morning I want to use the simple statement, in fighting the dairymen's battles along this line the National Dairy Union is fighting yellow oleomargarine, nothing more or less. Now, it is not my wish to burden this convention with the abstract condemnation of oleomargarine, or oleomargarine manufacturers or anything of the kind. I wish rather to point out a few concrete facts by reviewing the claims made by the dairymen through their national organization, the National Dairy Union. When Congress passed the present oleomargarine law, imposing a tax of ten cents upon the artificially-colored oleomargarine and one-fourth of a cent per pound on oleomargarine not colored, it was the intention of Congress to eleminate it, drive it off the market, or at least to make the produtcion very expensive. What is the result? After eight or nine years' enforcement of that law, probably 75 per cent of oleomargarine that is going on the market is yellow, and now I will quote some figures from the Treasury Department at Washington: Less than 3 per cent of the yellow oleomargarine put upon the market was taxed at 10 cents a pound. If you do not remember anything else that we say or do this morning, I say, please remember this, that less than 3 per cent of the 150,000,000 pounds of oleomargarine put out last year, or one pound for every nine or ten pounds of butter put on the market was taxed at 10 cents a pound. The other 97 per cent and over was taxed at one-quarter cent per pound. Then the oleomargarine men claim, and, of course, it is a good argument for them, that the 10-cent tax is what is keeping butter so high. The argument has been knocked in the head the last week or two by the prices of butter having taken a tumble. That has been the chief argument. The present oleomargarine law then has failed to keep yellow oleomargarine off the market, and some new measure or amendment to the existing law must be adopted by Congress to prevent fraud in the sael of oleomargarine. At the last session of Congress several bills were introduced, some introduced by your Congressman from Pennsylvania. A Congressman from Wisconsin introduced a bill amending the present law, strengthening it, and Senator Penrose also introduced a like measure in the Senate. I believe at the present time a Congressman from Pennsylvania has introduced another oleomargarine bill; but the two first mentioned I construed as being favorable to the dairy side of the controversy. They are made to prevent fraud. I shall go over this hurridly and touch upon the salient points. I hope it will not be too dry. Any time you wish to pull upon the string do so and I will quit. I will try to cover the salient points, because if I would go into details in this matter it would take more time than you or I wish to use.

All those bills introduced in Congress that are favorable to oleomargarine propose to allow the sale of yellow oleomargarine. That is the thing they are fighting for, and the dairymen are fighting against it. Of course, they provide for the original package and the internal revenue stamp. They say, "We will have this put up in one, two, three, or five pound packages, wrap a revenue stamp around it" and provide a heavy penalty for the violation of the law which will require that that product must not be removed from the original package until it is used. They are willing to agree to a two-cent tax on the product—in fact, gentlemen, they are willing to agree to almost anything so long as they are allowed to color their product to look like butter.

Now, some of our own people are being misled by this original tax. I believe dairymen as a class,—perhaps I am prejudiced,—but I believe as a class we want to give the other fellow all that is coming to him, and in the desire to do that a good many of our own people are standing up so straight that they are leaning over backwards and in this original package see, or think they see, a solution of the question. I remember when the question first came up last wniter; it was before I had given very much thought and attention to the question; I was being myself misled by this original package scheme. I thought that would insure its going out on the market and always being sold as oleomargarine; if it were colored yellow there would be no harm done so long as sold as oleomargarine. I remember going to Professor Hammar, however, of Minnesota, and I put the proposition up to him; he was busy that afternoon and he said, "I haven't time to discuss it," but he said, "Who proposes it?" I said, "It is the oleomargarine fellows." "Then," he said, "we do not want it." Now, that was a pretty homely argument, but a pretty sound argument nevertheless, and now I just want to point out the reason why that original package scheme would not prevent fraud in the sale of oleomargarine. In the first place it would not regulate the sale of oleomargarine i nhotels, restaurants and boarding houses, where millions of our people eat. It is argued that the State law ought to regulate that. Very well, but I will answer that with this simple question. If the State law can regulate it, why is it necessary to pass a Federal pure-food law? Now, the second proposition is this, and perhaps it is the most important: The Internal Revenue Department at Washington, the department that necessarily would have the enforecement of the law, is purely a tax collecting department and is not interested in the question of fraud, except where fraud is commited against the Government, by avoiding the payment of a specific tax. They could not possibly be interested in the question of fraud where oleomargarine is sold as butter. Their business is simply to collect revenue. If we had a uniform tax of two cents on oleomargarine the only thing that the department could be interested in would be to see that the oleomargarine manufacturers paid the tax of two cents a pound, and after that tax was paid into the government treasury the Revenue Department would lose all interest in the proposition.

Here is the third objection to the original package scheme: If that law could not be framed so as to enable the Government to prevent the hotel men, restaurant men, and boarding housekeepers from removing this oleomargarine from the original package and selling it to their guests as butter, how could the law consistently prevent the peddler going from house to house and doing the same thing. It is argued a heavy penalty would prevent irresponsible fellows from doing that. What is the use of the penalty when you have no part of the administration of the Government to enforce the penalty?

The fourth proposition is this: That the majority of our State law making bodies and the majority of law making bodies in foreign countries have attempted to regulate the sale of oleomargarine by controlling the color line. That is a pretty good precedent to go by but the reason why the State falls down in the enforcement of such a law is because the Federal law is not similar to the State law. I believe you have that same troubel right here in the State of Pennsylvania. Now the argument is put up that the oleomargarine people should enjoy the same privilege of coloring his product as buttermakers do, and some of our own people are misled there again; they can't see why if the buttermaker is allowed to use artificial coloring in his product, the oleomargarine manufactuerr is not allowed to do the same thing. Ladies and gentlement, I want to lay this statement down as a good sound pure food proposition: If it is necessary to do a certain thing to drive out fraud then that certain thing should be done. If it is necessary to prevent fraud in the sale of oleomargarine to wipe out oleomargarine altogether then that should be done. I lay that down as a pure food proposition; but I am not claiming that that should be done, and I believe that there is not a dairyman in the country who does. All the dairymen are asking for is the privilege of putting upon the market a yellow butter and denying that privilege to the oleomargarine manufacturer. I am going to prove in one point to the convention that the dairymen have the right to ask that privilege and the denying of it to the oleomargarine manufacturer. Here is the reason for it: The natural color of butter is yellow. No one is going to deny that. The oleomargarine men themselves admit that the natural color of butter is yelolw. Butter is more yellow during certain seasons of the year, and from certain breeds of cows it is a deep yelolw the year round. The maker of butter uses a small quantity of artificial coloring matter in order to preserve the natural color of butter the year round. It is still butter after colored yellow and it is not sold for something else. When the oleomargarine manufacturer colors his product yellow, he does not color it to give it its natural color; he does not color it to preserve uniformity; he colors it to make it look like something that it is not. Before the cow was domesticated she gave milk only during a few short weeks in the summer season, just enough to support her off-spring, and at that time of the year we know that the butter oil in her milk was yellow. Only man's development of the cow has made it necessary to use artificial coloring matter at certain seasons of the year in order to keep its natural color the year round. In the attempt to prejudice the people against Federal legislation that is calculated to prevent fraud in the sale of oleomargarine, manufacturers have claimed oleomargarine is the poor man's butter and that the tax of 10 cents a pound upon it is a burden upon the laboring classes. You hear that supposed argument advanced very much. I lay this proposition down: If oleomargarine is to be the poor man's butter, it must be sold to him as oleomargarine, and at eleomargarine prices. When it is colored yellow and sold to him at butter prices or nearly so, it ceases to be what is claimed for it. Go upon the market and you pay more for yellow oleo than you will for white oleomargarine, whether it is sold to you as butter or eleomargarine. Yellow oleomargarine always sells at prices of butter, or nearly so, whether sold as butter or oleomargarine. It is no less than insulting to insinuate that the American laboring man is in favor of fraud and deception in this matter. It is no less an insult to him to insinuate that he cannot afford to put pure food on the family table and that he must be pointed out as a user of cheap and adulterated food. As a matter of fact no better butter market exists than you find in communities where poor classes of laboring men predominate. Oleomargarine manufacturers claim that they are the sponsors for the consumers in the country in this attempt to repeal the present law and that the dairymen are selfish, that they are not satisfied with the price of butter that has prevailed the past few years, and that they want to create a monopoly and boost butter prices higher. We heard a great deal of such talk at Washington before the House Agricultural Committee, where the hearings on the different bills were being held and that was one of their big arguments in trade. They go before Congress pretending that they represent the consumers of the country and that the dairymen represent the pecuniary interests.

Let us analyze that. Who is the selfish man? Is it the man who wishes to create conditions where food products can go upon the market and sell through merit at consistent prices created according to the supply and demand, or is it the man who wants to create conditions where the consumer can be more easily defrauded and humbugged? When the arguments of these people are analyzed there is only one sensible conclusion to which a person can come: that they are not seeking to protect the consumer; they are not seeking to get a poor man's butter upon the market; the are seeking to create conditions whereby that consumer can be more easily humbugged than they are at the present time. What are they claiming the dairymen are selfish about at this time? I am presenting these arguments so that you can use them in refuting the claims that are put up to you in your every-day wor, because they will certainly come up as they do in conversation. What is the dairyman asking for? Simply asking for conditions that will provide that oleomargarine be sold as oleomargarine, and butter be sold as butter, and that they both be sold at a consistent price. I make the claim without reesrvation this afternoon, that it is impossible to regulate the sale of oleomargarine and prevent fraud without controlling that color line, and if some one will show me wherein I am wrong, or where the other dairymen of this country are wrong, then it will be time enough to talk that kind of a proposition. The only thing the oleomargarine men are striving for is the coloring of oleomargarine. So far as the development of their business is concerned, the situation at the present time is entirely satisfactory to them, and let us not forget that. Their business increased last year from less than one hundred million pounds to over one hundred and fifty million pounds, an increase of 50 per cent. That is pretty good for one year. They are entirely satisfied with the present conditions, except that their product is pointed out by the Congress of the United States as a substitute for a genuine article, and if they could secure legislation which would be favorable to their side it would simply be placing the stamp of approval of the United States Government upon their product, and that is really what they want. It is not the elimination of that 10-cent tax; the product is only paying a quarter of a cent tax. The present situation is entirely satisfactory to them, except that they desire to go to the people of the country and say that Congress has put its stamp of approval upon their product by eliminating this outrageous 10-cent tax that makes butter cost the poor laboring men just 10 cents a pound more than it ought to. If the statement is true that they make, and butter were 10 cents a pound less than it is today, there would not be much profit in the dairy business. But we know that the 10-cent tax has absolutely nothing to do with the price of butter, no more than the man in the moon has had anything to do with the price of butter, because oleomargarine has not been taxed at 10 cents a pound.

I lay this down as a warning to the dairymen, that he should not fight the oleomargarine as such. Now, I believe I have been in a position to learn the sentiment of the people of the United States and I have a very wholesome respect for the sentiment. I believe in majority rule, and I want to tell you friends here this morning, that the sentiment of the people of the United States is against this 10-cent tax on colored margarine. Why? Simply because they do not understand that oleomargarine is not taxed 10 cents a pound unless colored. The hysteria in regard to the high price of food products that has prevailed over the country in the last few months has been responsible for calling attention to this supposed tax on all oleomargarine, and the oleomargarine manufacturers have been acute enough—I admire them for that—they have been acute enough to spread the false idea tall over the country and encourage the people's prejudice along that line. I believe when the consumers of the country really understand that the dairymen are asking only for the elimination of coloring of oleomargarine, then we are going to secure that. When this question is settled, it is not going to be settled on the basis of what is to the advantage of the dairyman. We may just as well get that idea out of our heads. Congress is never going to get this question right if they settle it for the particular benefit of the dairy industry, the oleomargarine people, or the poor laboring man.

I will tell you what basis it is going to settled on, and that is on the basis of what is just and will prevent fraud upon the consumers. I want to make this statement here this morning, that when it is settled in that way, if the dairy industry cannot survive then that industry is not founded on the correct principle. I do not believe that dairy men can afford to use their power at Washington, which is appreciated at its full value by the most skilled politicians for asking anything that is unreasonable, and I do not believe that dairymen can afford to be put in the position of light of asking for anything that is not reasonable. I found that what you should ask for is simply that fraud be driven out of oleomargarine. Let them sell it if they want to. Let the people eat it if they want to, providing it is put out in its natural color and the consumer, no matter where he may be, knows that he is eating oleomargarine when he eats it. If we can get the question settled on that kind of a basis, and if the dairy industry cannot survive, then it is not founded on correct principles. If we will stand on that kind of a platform there can be just on result in this fight. It has been a long fight; it will, I believe, be a still longer one for you people who come here and talk about what must be done to drive out fraud in the sale of this substitute. I do not believe these dairy men should speak of oleomargarine as a competitor of butter, because it never can be. No sane person, providing they will give thought to this question, will agree with the argument advanced by the oleomargarine interests that oleomargarine is as pure, wholesome and nutritious as butter. If you could read my thoughts you would see I have these three words in quotation marks—pure, wholesome and nutritious. We heard them so much at Washington last spring that I never can forget them myself. The claim of the oleomargarine people is that oleomargarine is a pure, wholesome and nutritious product, and is being discriminated against by the Government of the United States. And I say no sane persons will agree with that argument provided they give thought to it. Leave the ingredients natural to butter out of oleomargarine and you have a product that will neither taste, smell or look like butter, and the cost of producing oleomargarine is regulated by the amount of butter that goes into it. Just as the amount of butter in oleomargarine is increased the price of the product is increased, and the value advanced. Then it is not foolish to claim that the product is just as pure, wholesome and nutritious as butter? Let me urge this in conclusion, that we just stand upon the principle of driving out fraud and nothing else and maintain that stand all the way thorugh. We are then standing on the solid rock against which nothing can prevail all we are going to win.

Friends, I have been asked to recite a little poem here that I have used before in meetings in the West. I have never before been guilty of using it here, yet I believe I am running a little risk, because there are one or two men in the hall that have heard it before. I have been warned out West that if I ever repeated the offense I should suffer, but probably you have not heard it. I should have given it to you in connection with that greeting that I brought to you from the dairymen of Minnesota. Perhaps you know that before you can become a full-fledged citizen of certain districts in Minnesota you have to learn to talk the language. This little poem that I am going to recite is intended to show the feeling that the Scandinavian farmer has for the old brindle cow, and it is supposed to have originated in Freeborn County, where our friend White came from.

The President: Ladies and gentlemen, are there any questions you would like to ask Mr. Slater on the very interesting address he has just given us? If not, I will announce that this afternoon when Mr. White gives his address on market requirements of creamery butter——

Prof. Van Norman: It is fifteen minutes before noon and this is the only time we are going to have to give to the creamery subject. There are three first-class men on the program and I would not like to take this adjournment of the meeting before twelve o'clock without giving a chance to ask questions. I am sure somebody must have a question to put to Mr. White and Mr. Slater.

Mr. ———: I would like to ask Mr. Slater if they use anything else beside the butter product and oil?

Mr. Slater: They secure the ingredients that make up oleomargarine with the view of getting that color even at the sacrifice of quality in the product, and the popular ingredient is cotton seed oil. They use an unrefined grade of cotton seed oil; that is where they get most of their coloring from. They also use different ungraded oils, selected with this purpose in view. Where they turn out a high-class product, the coloring is comparatively easy. They use a large quantity of uncolored creamery butter. They buy it up during the summer season on a contract with the creameries requiring that no artificial coloring matter shall go in the product and that is used for the purpose of coloring. As a matter of fact, the poorer the oleomargarine, the higher color it has. That answers your question. If they do not get the coloring they use butter. They use a larger proportion of this unrefined cotton seed oil, which lowers the quality of oleomargarine. In making that statement I am quoting an oleomargarine manufacturer's testimony at Washington. If I may just touch upon that cotton seel oil proposition—they have attempted and succeeded to a certain extent to array certain cotton growers against the dairy men. They point out in their shrewd way to the cotton growers of the south that with the manufacture of oleomargarine there is a market for their cotton seed oil. Now, absolute facts, statistics gained from the Department at Washington, show that for the cotton seed oil used in oleomargarine last year the cotton growers of the south received the magnificent sum of one-half cent an acre. If the oleomargarine people were allowed to artificially color their product without paying this higher tax, they would quit using cotton seed oil, because just as soon as they use it it lowers the quality of their product. I believe that when the question is eventually settled on a basis where it is going to stay settled the oleomargarine manufacturer will strive for quality in his product just as much as the butter men will, because it will be a dollar and cents proposition with him. They are using at the present time that unrefined cotton seed oil for the purpose of getting the yellow color. The color is worth more in oleomargarine than any other factor.

Mr. ———: They say in the literature that the oleomargairne people can't stand the tax on the oleomargarine. Is it not a fact that the bill now before Congress (if it were to pass) will make the tax about eight times as much as it is today?

Mr. Slater: Yes, the question answers itself. The bill proposes a tax of two cents a pound. At the present time oleomargarine is taxed a quarter of a cent per pound, and I can't see why this pure, wholesome and nutritious product should be taxed two cents a pound. If the tax is not for the purpose of driving out the fraud for which the ten-cent tax was intended, what is the use of taxing the poor man's butter two cents a pound? I don't think it should be taxed; I would rather see the tax at a quarter of a cent a pound. That is enough to bring it under the supervision of Government authorities, and then drive the fraud out of it. Don't tax the poor man's butter. The tax that these people are condemning, they propose raising from a quarter cent to two cents a pound. As I have said before, they are willing to do anything as long as they can color it yellow.

They use milk and cream in churning the oleomargarine up in the factory; that is one of their processes I did not call attention to. They get the the same result as if they put the butter right in. Then, of course, they introduce casine, that is, simply mix butter products with oleomargarine.

The President: I would just say that at this afternoon's session Mr. B. D. White, of Washington, will give us an address on "Market Requirements of Creamery Butter," and during that address the butter that is here on exhibition will be brought into this room and scored by Mr. White. You will find the address very interesting and practical, especially as it will be given in connection with the scoring of the butter.

Adjourned until 1:30 o'clock p. m.

## AFTERNOON SESSION.

January 25, 1911.

The President called the meeting to order at 1:30 p. m.

The President: First on the program will be an address by Mr. E. K. Slater on "The Value of Traveling Dairy Instructors." He is the same gentleman that spoke on the oleomargarine question this morning. I take great pleasure in introducing Mr. Slater.

## THE VALUE OF TRAVELING DAIRY INSTRUCTORS.

**E. K. Slater, St. Paul, Minn.**

I feel that I owe you an apology for attempting to talk to you on this question. I did not know until I struck town this afternoon that I was to talk to you more than once today. You can see that my intentions were all right. It is not your secretary's fault, however; he spoke to me sometime ago, but, as I recall, asked me to discuss some other question, and I told him that I was always willing to talk whether I had very much to say or not. A few days ago he sent me one of your programs. I should have looked at it, but I did not. I remember his telling me a few days ago I was to be here on Wednesday. I am not prepared to discuss this question, but perhaps I can open it for discussion. I believe it to be a thoroughly important one.

Perhaps in order to make myself perfectly clear to you I should tell you just what experience I have had in this line. That will give you the reason perhaps for my referring to Minnesota as I may do from time to time in the short talk that I shall try to give you. I was not born in Minnesota, but raised in Southern Minnesota on a dairy farm, and have always been in the dairy business. I was not only raised on a dairy farm, but I worked as a hired man on a dairy farm and I courted my wife on a cow farm. I just want to suggest to any of you young fellows this afternoon that if you have got that job ahead of you, there is no better place to court a girl and be sure of what you are getting than on a good cow farm. I operated a creamery several years in Southern Minnesota, and for the last eight or nine years I have been spending my time in State work. Now, I mention this for the purpose of trying to impress upon your mind that I have had some contact with farmers. When we speak about the value of traveling instructors we must necessarily include the instruction that we hope to give the farmers along dairy lines. Now, I know farmers; I think I do, and so I know the kind of instruction that they will welcome, and the kind of instruction that they will resent. Unwelcome instruction is of no value whatever to the man whom we hope to instruct.

Perhaps I had better outline briefly the plan of dairy instruction in Minnesota and then point out where I believe they are at fault in that State, and where you may profit by their experience. I mention Minnesota because I am acquainted with the situation there, and because the State has done so much toward educating dairymen to keep better cows and produce better dairy products. We have a State Dairy and Food Department in Minnesota. The Commissioner is appointed by the Governor and usually because of his value to the Governor in the previous campaign. I understand you do not have politics in Pennsylvania, but we have in Minnesota, and we have had that to contend with. I have held the office a few years myself, and I know what a man has to be and to do in order to get into office. The department in Minnesota has inspectors. I understand that according to the Constitution in the State of Pennsylvania, they cannot have inspectors in State service. In Minnesota they are known as inspectors and most of the educational work that has been done by traveling men from various counties has been done by inspectors of the State Dairy and Food Department. Now, I am happy to tell you that these inspectors are not politicians; they are men selected under a civil service law and must be trained men in order to get the position. They must give wholesome instruction to the dairy men of the State and do good effective all-around work in order to hold those positions. The result has been quite satisfactory. The Commissioner has supervision over these men, but only to direct their work in an administrative way. Some of the instruction work has been done under the supervision of the dairy school at the State Experimental Station, but most of it has been done by the inspectors.

Now, I want to make myself perfectly clear and be consistent in whatever I am telling you. I first want to lay this proposition down that I believe where it can be properly carried on, the instruction among farmers and buttermakers is more effective where there is a police power back of it. That is the reason I think the work has been so successful in the State of Minnesota and other States that I have been more or less connected with. In considering the student it is usually a pretty good thing to have a club lying close by to hammer the instruction in with. Buttermakers, cheesemakers, creamery patrons and factory patrons are only boys grown up. The same kind of discipline that is so effective in the child at school, depending upon the nature of the child, is often just as effective upon adults, and this police power back of the instruction, I believe, is a mighty good thing.

I might suggest that in a State like this, where you canont have the inspectors, your work might be carried on through the State Experimental Station. These instructors should have some sort of police power back of them, granted by the State Board of Health or State Dairy and Food Commission. Please don't misunderstand me. In a majority of the cases this police power is not necessary, but it is only to bring the erring ones up with a jerk when necessary. I believe that when the buttermakers and dairymen know that the man who is going from factory to factory and from dairy to dairy has this police power back of him, and has the power to bring offenders into court and subject them to fine or imprisonment or both, it has a very wholesome effect. They treat him with more respect. I believe that the State Dairy Schools, or the dairy division at the Experimental Station is a better fountain from which this information shall come than the Dairy and Food Department. The latter is mixed up more or less in politics, as it is in Minnesota. If you can in some way give to these instructors sufficient police authority for this wholesome moral effect upon the man in the business, it will be a very good solution of the situation. In fact I believe that an arrangement of this kind would be even better than the arrangement in Minnesota where it is done by the Dairy and Food Department.

I am very much in favor of the enlargement of the activities of our dairy department at our universities. I have been connected with one of them in the last two years, and know the kind of instruction that they aim to give. Now, I will pass on and lay particular emphasis upon the kind of instruction that it to be given to the buttermakers and the dairymen in this kind of work throughout the State. I believe that I am speaking to a sympathetic audience when I mention this, because we know that upon the progress of agriculture depends the ultimate success of a State, even like Pennsylvania, with all her mineral wealth. We must encourage agriculture, and there is no branch of agriculture today that we need to encourage any more than the dairy business. To the kind of instruction that shall be given it is necessary to give great thought and conisderation.

Now, the trouble in delegating this work to the agricultural college—I am going to speak frankly—is that the agricultural college is liable to make the mistake of putting inexperienced men in the field to educate the dairymen and the buttermakers. They may have the theoretical knowledge to do that, but they have not the tact and personal magnetism about them to get next to the man that is to be educated, and the result is that conditions are made worse instead of better. There is a great obstacle to overcome, if you please, in delegating this work to our agricultural colleges, and I say it with no disparagement whatever to the agricultural colleges, because they are doing the best they can. When that work is delegated to these institutions, there should be some method employed by this organization, if you please, to see that men of the right personality and right training are put in charge of the work.

Now, I have seen many young fellows fail in their efforts to revolutionize the dairy business in particular localities. I have been connected in my work for several years with the various schools. Every year we turn out from one hundred to one hundred and twenty-five bright, clean young fellows who have served their apprenticeship in the creamery. If they do not get anything else in the time they are in that school, they get chuck full of enthusiasm and go out with a determination and a feeling that they are able simply to revolutionize the dairy business in the locality into which they are going. The result is they begin at once to tell the farmers just where they are making the mistakes and what methods they should employ to get more milk from their cows and how they should take better care of their milk and cream. I have in mind now one young man who has been several years in gaining his experience. He frankly admitted that when he finished school and went to a certain locality in Southern Minnesota his intention was to transform the community from that of ordinary farmers carrying on the dairy business as a side issue, to a community devoted exclusively to dairy farming. He was going to do it in a few months. Now, I have always admired the young fellow's enthusiasm. His heart was right, but his mind was wrong; and there are many fellows starting out to do that very thing. If I wanted to go on and be still more frank with you, I could quote from my own experience.

So it is very essential that the men who are to carry on this instruction shall be men that are thoroughly trained for the work, not only theoretically trained, but trained along practical lines. Now, I do not believe that it is possible to take a city-bred young man and put him through an agricultural college and send him out to instruct farmers with any hope of success. He will be the exception to the rule if he makes a success of it, especially if the farmers find out that he came from the city. But it is not necessary to do that. This work can be started by having one or two men of training and experience who know how to approach farmers, and when I say men who know to approach farmers, I mean men who know how to approach any other class of United States citizens, because when everything is analyzed we find about the same kind of human nature running through different people, no matter in what business they may be engaged.

I am not throwing boquets at farmers, and I am not going to throw any bouquets at buttermakers. I am not throwing any bouquets anywhere, but I do like to call things by their right name. I might go on and state, as I guess I will, that the farmer is generally looked upon as a man who would not do anything out of the way. However, if I may enjoy the liberty of indulging my observation it is this, that if I would want a good job of skinning done, I would just as soon pick out a farmer to do it as any man I know of. On the other hand if I would want to find a good, wholesome citizen I would just as soon look among the farmers to find him, as to look among the buttermakers, and I am a buttermaker. The business we are in has very little to do with the kind of men we are. A farmer is just as intelligent in his line of work as the majority of people in theirs. You can term him a hayseed or whatever you please, but the fact remains that he is a reading, thinking citizen. You send out an experienced man to insrtuct him how to take care of his cows and cream, and after all is said and done possibly it is up to the instructor who is doig the work, whether he is going to get next to that farmer or not. The instructor cannot get next to him in any beter way than to have that practical training included in his experience. The amount of hair he has on his head has little to do with it. Some of our best dairy instructors in the Western States are young men, but they are men who are trained along practical lines as well as theoretical lines. When they tell a farmer he should feed ensilage to his cows in order to get thick milk and lots of it, they are able to tell that farmer how to produce that ensilage from the time the crop of corn is put into the ground. If an instructor cannot dispense that kind of instruction he is not going to be on the farm fifteen minutes before some hayseed trips him up and shows him he does not know what he is talking about, and when the confidence of the man who is to be instructed is once lost, then the instructor will be of very little value.

I wish I might emphasize that still more, but I do not know how. I know that the thought will be seconded by everyone here, and I want to emphasize it so that you will take up this work. There is a general awakening in Pennsylvania as to the necessity of encouraging dairying and agriculture in general, and with this awakening you will have to give this instructional work in the different localities.

Perhaps I ought to go into detail a little more to indicate how that should be done, and I will do it very briefly. In the first place this work can be helped along by holding a large number of local dairy meetings, and the man or men who are responsible for carrying on the work must be sure that the right kind of speakers go to that meeting so that the interest of the farmers may be kept up. We have made that mistake in lots of sections in the West, where we have been holding too many dairy meetings. The result has been a lot of incompetent men have gone to those meetings and discouraged the farmers, and now you cannot get them out to a meeting under any promise or method of coercion. So you must be careful not to make that mistake. Hold a few district meetings; let them be well advertised and you will have them well attended. Get up a discussion along common lines and have the men there that will be competent to do it. In an annual convention such as you have here, you talk these matters over, and you go home and forget them and nothing is done perhaps until next year. That kind of dairy instruction is not very effective. You have got to go home to the farmer that needs it. The man who will come to the State dairy meeting of this kind does not need dairy instruction; he is a good enough dairyman as it is. Let him be. It is up to you to encourage and carry on this work in the localities in which you are engaged, and to take an interest in the larger work of spreading this dairy instruction.

When you have gone far enough in that, I think it is well to encourage district associations where the farmer is shown the relative returns he is getting from his cows, and is encouraged in breeding better stock. Now, a suggestion as to the kind of education, that is, the quality of this education that should come out along a particular line, and that is this: With all due respect to any college men that may be here or any advocate of the pure-bred Jersey, Guernsey or Holstein cow, I want to tell you that the common cow—I don't care what she is, just so she is about seven-eights common cow—that old common cow is entitled to a whole lot more credit than the people have given her. This is not an argument for the common cow. The fact is, however, that we must not get too far away from the common cow in our efforts along dairy instruction lines. If we are going to carry this dairy instruction out to the farmers, then we have got to keep pretty close to conditions under which he is working. And when we do that we have got to deal with the common cow that is on the farm. Not being familiar with conditions here, of course, I may make some very impractical statements, but you will pardon me if I speak of the conditions as they are in the West, rather than as they are here in the East. This common cow, this much-maligned common cow, has made dairying possible in this country. She has built up our creameries, paid off the mortgage on the farm, and got comfortable bank accounts for the farmer. Now, do you blame him for not wanting to turn away from her all at once, because the college man tells him he cannot afford to go on without having blooded Jersey cows. Out in Minnesota the farmer knows who carries him through grasshopper time, and when a young fellow comes around and tells him "You are a fool to keep that old scrub cow on the farm; you ought to get some Jerseys and Guernseys," what is the conclusion that the farmer is pretty apt to come to? It is a sensible conclusion , is it not? I refer that to any breeder here. I am not putting this up as an argument against full-blooded cows; it is simply this, that our cows on our farms today are better cows than our farmers are dairymen, and we have got to educate that farmer before he can make a success of keeping full-blooded cows. Just as he progresses as a cow-keeper, then he may improve the quality of cows and make a success of keeping them. Take the average creamery patron from the country today and he has got good deal better cows than he is a dairyman. I often remember what ex-Governor Hoard, of Wisconsin, said at a dairy meeting. He said, "If the cows of this country had a voice they would be here calling for a better breed of dairymen." I think there is a whole lot of truth in that. If a man who wants to make a specialty of dairying or a man who has the disposition, the time and the conveniences to go to dairying on a larger scael, I would advise that man just as strongly to get full-blooded stock; he will then be a dairyman. But this term dairyman is an elastic one. As we apply it to farmers we are not speaking of dairymen, but men who carry on farming with dairying as a side issue. They have a few cows on the farm and keep them year after year and the Lord only knows what they do, or do not. They do not know what the cow is doing and they think they are in the dairy business. Yet, my friends, under those conditions, the cows have made dairying possible for that kind of a farmer and have built up the dairying business in a great many of our States. It simply shows what dairying will do in spite of the dairyman, and shows, too, what the dairy business can be made to do by the right kind of dairymen with the right kind of cows. With that kind of a man we should apply the instruction along dairy lines. I may advocate the Holstein, the Guernsey or the Jersey cow, provided she can be put in the right kind of hands. I do not want anybody to get the idea that I am not an advocate of the pure-bred dairy cow of any of these breeds, because, for the man who will give them the kind of care they ought to have, they are the kind of cows he ought to have. I am not naming any of those particular breeds; I leave that to the dairyman who wants to go into the business, but I do believe that for this ordinary farmer we are going out to instruct we must keep pretty close to the old cow, and not say much about Jerseys and Holsteins and these other breeds. We should, however, talk to him about improving those cows by a system of breeding,—something that is inexpensive to him in building up his herd. At the same time he is improving himself as a dairyman. He should get a good sire and improve his herd along better lines. Of course, those subjects will be handled by other speakers, and I will not go into that, but I hope I have made myself perfectly plain, and that I am just as much in favor as a man can be of this pure-bred cow in the hands of the right kind of a man. But to go out and advocate to the farmers of Pennsylvania that they shall sell off their scrub cows and common cows and get Jerseys and Holsteins in their place would be a fatal blow to this kind of education which we hope to carry on. In the first place you could not find the pure-bred cow if you wanted to. In the second place you could not get money enough in the State of Pennsylvania, rich as you are, to buy enough to go around, for they are very valuable, these better bred cows.

Speaking of the Holstein and Jersey cow reminds me of a story about an argument between a Jersey and Holstein man. The Jersey, you know, is noted for giving very rich milk, but not very much under certain conditions. The Jersey man said to the Holstein man, "My friend, do you know how I can tell whether milk comes from a Holstein cow or not?" He said, "Take a pail and milk that cow, put a half dollar at the bottom of the pail and if you can see the half dollar through the milk that milk comes from the Holstein cow." That was a pretty good one and the Holstein man said, "Do you know how I can tell whether it comes from a Jersey cow?" He said, "No." "You take that same piece of money and a pail and milk that cow and if the milk does not cover the half dollar it is a Jersey cow." And yet I believe I am quoting many of your views this afternoon when I say that the Jersey cow is the most economical producer of butter of any cow in the business. The farmers of the country, however, are not ready to handle the Jersey cow; they are not able to take care of the Jersey cow as she ought to be taken care of. As a rule farmers know how to take care of ordinary cows, know how to breed them, feed them, and take care of the milk and cream. I have had some experience with pure-bred ocws. I moved to town, went into this State work and my wife was calling for a Jersey cow. I wanted to have a good cow, of course, and I felt I know how to take care of a good cow. I was well enough acouainted with the professor at the agricultural college to get one of the cows out of the herd; I paid high for her, but I got her just the same. I took her home and she stayed three weeks with me, and all of the milk and the feed and all of the water that that cow consumed in that time, I was going to say you could put into a stiff hat. I guess you could put all the milk there to without running it over. I could not make friends with that Jersey cow. I used all the theory I had available and called into practice all of the practical experience I had, but I could not get on the right side of the Jersey cow and make her eat and give milk. The result was that I had to trade her back and get one of those old black and white Holstein cows. Then the dairy business was solved so far as I was concerned, and I got along all right. But it shows the sensitiveness of those highly bred cows, and I think the Jerseys are more peculiar in that respect than the other breeds. If the ordinary farmer takes that cow and lets her sleep in the straw shed and eat straw for her health, as a good many of them do, he has no business with that kind of a cow. Now, of course, the farmer in Pennsylvania would not do that. Your farmers are more enlightened—I am assuming a great deal perhaps—but they are not in Minnesota, and we have those conditions to contend with.

I have talked longer than I intended to, but perhaps I have opened a field for discussion here, and I am going to ask you not to expect me to punish you any longer. I thank you for the attention that you have given me. I hope that you will, through your organization, or organizations, work out some feasible plan for encouraging education along the lines that I have outlined. If I have emphasized the common cow too strongly it has simply been for the purpose of pointing out the danger that lies in approaching a farmer. Let us approach him on the ground he is standing on and then gradually work up from that standpoint. I thank you very much.

The President: We do not want to pass over this very interesting subject without some discussion. Mr. Slater will be glad to answer any questions you may see fit to ask. I would like very much to have a discussion on this subject.

Prof. Van Norman: I did not hear Mr. Slater call attention to some of the specific results that the instructors in Minnesota have brought to the creamery buttermakers in that State. I was in St. Louis and saw the wonderful record the buttermakers made down there in competition with the world. I want him to tell a litle about that.

Mr. Slater: It was modesty kept me from mentioning that.

Prof. Van Norman: About the help that the instructor is to the buttermaker?

Mr. Slater: I think I can say without fear of successful contradiction it is just this kind of instruction that has made Minnesota the reputation that it enjoys as a butter-producing State.

How many banners do we have?

Mr. ———: Six.

Mr. Slater: I did not ask the question to emphasize the number. It is not so many but that I should remember, but I was not positive whether it was six or seven. There are only two held by any other State in the Union. Illinois and New York have one each, I believe, making eight in all. Minnesota has six.

Prof. Van Norman: What are those banners?

Mr. Slater: These banners are awarded by the National Creamery Buttermakers' Association at annual conventions. At these conventions butter is exhibited from the various States of the Union. Then the highest average is taken of the butter from these different States. The highest average is one hundred, and the State that sends butter with the highest average gets the banner. Of course the intrinsic value is not especially great to the one that gets it. It is generally conceded in the West, not only in Minnesota, but throughout other States, that this result has been brought about largely through these traveling instructors. It has also been largely brought about through the co-operation of the buttermakers with the patrons in bringing good material. It is simply the rule that when you have a reputation for a product you are going to get more money for it no matter what you are selling. The farmers of Minnesota are receiving pecuniary results from the winning of these banners. They say Minnesota cows are not producing what they ought to and farmers are not getting from their cows what they should. The quality of their butter, however, has been particularly emphasized and it has been from this particular kind of instruction at the dairy schools and the different departments and by the differetn dairymen's associations. We have two dairymen's associations in Minnesota, one composed of butter and cheesemakers and the other of dairy farmers. It is that joint work between different forces that brings about these results, and has brought them about. You can do the same thing here, and in doing that keep just as far away from politics as you possibly can, because when you get politics mixed up with organization work of that kind you not only get a class of men in the work that should not be there, but you also get men who cannot work in harmony. That seems to be the outcome, anyway. Politicians have at heart their ambition more than the benefit that is to come to the industry that they are in. Of course, I am talking on a subject that you are not interested in here in Pennsylvania.

Prof. Van Norman: Mr. Slater, who pays for these instructors.

Mr. Slater: The State of Minnesota bears the expense for all of this instruction work. The dairy school is maintained as a branch of the State University, and, of course, is supported by the State. The Dairy and Food Department receives an annual appropriation of approximately $60,000 for carrying on this kind of work. They must carry on the food inspection work in connection with that, but I guess perhaps the larger proportion of it comes with dairy instruction. The State Dairy Association receives an appropriation of $2,000 a year to send men out to meetings and discuss various subjects. Then the association gives an appropriation, I think, of $600 a year, so that that work is all carried on by the State. I am happy to be able to say that the officers and the members connected with these different institutions all work in harmony, or have at least since politics was really eliminated from that work. To be serious, politics have been practically eliminated from the work. That is the reason the work is so effective at the present time. Then I have not mentioned the farmers' institutes which give an appropriation of about $30,000 a year. The institutes lay particular stress in their work upon the dairy business. Judging from the conditions that I can see and hear about here in Pennsylvania, I believe the plan for you to follow out is for this organization as dairymen to devise some concrete scheme of organizing this work and placing it in the hands of the dairy division of your agricultural college. Then secure some sort of co-operation with the Dairy and Food Department so that the Commissioner can give these instructors a little police power to exercise when they need it. This will make a very good combination so far as I can judge.

The President: Any further discussion? Mr. Slater spoke about the State of Minnesota receiving $20,000 a year from the farmers' institutes and $60,000 a year for educational work along these lines. I admit we should at least do some work. I believe we have done so much work according to the amount of money received. We have received, I know, a magnificent sum for our educational work; we have been getting $500, so I don't know that we can make similar progress along that line. I happened to be one of the committee that came before the Legislature for a small appropriation of $10,000 for that work. We did not get the money; we got the laugh. I think the State Legislature so far as appropriation goes, has been very derelict. I know very well that if we had received the amount of money which Mr. Slater has been speaking of, we would have a corps of instructors clear of politics. Until we get some one to pay the fiddler we cannot expect to have music. We reach into our pockets for our funds and the appropriation goes to some other cause. I think the dairy industry and agriculture have been seriously neglected. I think it is time we all get together and give the matter a push. This is a very important and interesting subject. I would like very much to hear from someone else. Give us your idea. It will help the ones who are trying to help you. Tell us what you think of the matter in as few words as possible.

Mr. R. J. Wells: I was very much interested in what Mr. Slater said about the improving of the dairymen at home. I went back to my father's barn a number of years ago, chuck full of this enthusiasm that the gentleman spoke about. I found it very hard work indeed to interest my neighboring dairymen in bettering their condition as I thought. I succeeded in a measure in getting some changes. I invested a little money for paraphernalia, and in that way got them interested in the matter of improvement. As Mr. Slater has said, in Northwestern Pennsylvania, the cow carried the farmers through hard times, through thick and thin, and they know she has done them good and made a profit for them. The thing that is hard for the dairymen of Pennsylvania to understand is that they themselves are the element that need more improvement than do the quadrupeds on their farm. We ourselves have got to set the example toward the improvement of the dairyman and get him interested in his improvement, and also in the improvement of the condition under which he is working and the improvement of the stock with which he works. I am satisfied from my own experience that if we could simply follow along the line of improving upon what we have by using the methods suggested by the agricultural departments at the State College, every dairyman in Pennsylvania would be benefited. It would also awaken an interest in the use of the lead pencil and the brain in finding out where we are at. A great deal of good would in this way accrue to the dairymen of Pennsylvania, I am sure.

The President: I know full well after this meeting is over you are going to break up in little groups and have a most enthusiastic talk. That is good, but why not give us all the benefit of your experience? I would like very much to hear further expressions of opinion on this same subject. Don't be afraid of any one going to hurt you; we will all be glad to hear from you.

Mr. Smith: I would just like to emphasize what our brother said about teaching the dairymen by example. I know that in my travels around over the country I have seen dairymen who were doing better work and who had better conditions in the herd than I had at home. I would go home and practice some of those things. My neighbors would come into the stable afterwards and see my herd and become dissatisfied with the conditions in their dairy and the next step would be to try and remedy those conditions. Simply by seeing what others were doing to advance brought about some reform.

The President: Prof. Van Norman will lay down the rules in reference to scoring this butter. I want to say to Mr. White that he has set a very high standard for himself this morning; he will have to come right up to the scratch if he is going to keep to the same high standard this afternoon. We are going to expect whole lot of him because we got so much more this morning than we expected.

Prof. Van Norman: Mr. President, we have no tool invented or scales for reading the quality of butter and therefore it is a matter of judgment of man, and as long as it is so there will be more or less opportunity for difference of opinion. But it has been my opinion that the only way to make these scores of real value is to get men to do the scoring who stand high as judges of butter and as men able to express their judgment on the score card, because that is the only way we have. Furthermore, the judgment we want is the judgment that represents the ordinary market estimate of the quality of butter. To give a man a score of 96 for butter that is worth only 93 because it will make him feel good does not help his buttermaking ability at all. Giving a score of 89 when a man may be entitled to 90 may make him mad and if he gets real mad maybe he will become a better buttermaker. The chances are that too low a score will not hurt the industry anyway, but when we give a man a score that is too high, it is really a detriment. I may have said to this association before that when butter has been scored about two points too high it makes our buttermakers feel good and get out a good exhibit. The reason why our scores run low, in my estimation, is because our butter has been low, and when we have a high score it is because we have good butter, and I know that Mr. White is one of the five best butter judges we have in the United States. I have seen his work on and off for the last four or five years. I believe that the scores will represent the market estimate of the quality of butter. This afternoon he is going to score this butter and talk as he goes and answer questions. We are going to give him an hour or an hour and a quarter. It will be your fault if you do not get all the information he has got to give you in that amount of time. I want to say further that these tubs have come in here and Mr. White does not know whom they come from. On the tub there is simply a mark which the clerk will record. When he criticises the poorest butter, it may be your butter, if you have any here. On the other hand, if he holds up some and says this is the best piece of butter, that may be yours. I hope you may all have the best. We have tried to have a fair and impartial judgment of it and that is what we want, and I believe that is what we will get.

Now, I suppose if we would jog our scores up several points we would have one hundred instead of twelve or fifteen below. I would rather have twelve or fifteen below and have the score represent market requirements than have one hundred points, if the score were not just.

I wanted the opportunity to say this because sometimes our buttermakers who get low scores feel that perhaps there has been partiality or somebody has not had a fair show. I also have heard this criticism, that, of course, the boys from the dairy school will get the high scores. Well, maybe they do; sometimes they do. If they do it is because they have learned how to make the kind of butter that the judge believes the market wants, and we have tried to have in our dairy school the men who know how to make that kind of butter. If they succeed, that is the result. That is not the result of collusion. The same thing happens in every other State where we have schools, the boys who learn the science of butter making are the boys who get the scores. That is just. There must be some relation between know how and quality.

I thank you for the opportunity of making this explanation in regard to the impartial scoring, the ability of the judge, and the value of impartial scoring in knowing where we are at. Mr. B. D. White is engaged in creamery and dairy investigation at Washington. He was formerly one of these creamery inspectors and instructors Mr. Slater was telling you about, and he has been in the creamery business, as you have learned this morning.

## MARKET REQUIREMENTS FOR CREAMERY BUTTER.

### B. D. White, Dairy Division, Washington, D. C.

Professor Van Norman said that I would talk to you while I was scoring. I would like to ask him how a man can talk with his mouth full of butter. Therefore, with your permission, I will say a few words before starting on scoring.

Now, we have arrived at a very critical period in the butter business, and I believe that this time is opportune for me to express mv opinion. For the past six or eight years—yes, ten years, the price of buter has been going higher and higher until we have reached the climax, and I believe that we will see a declining market. Now, there are reasons for this and I want to give you my reasons for it: In certain sections of the country, notably the Central West, the hand separator was introduced a few years ago. Instead of delivering the milk daily the farmers delivered the cream. A little later some concerns saw an opportunity to have the cream shipped by rail. I know of cream being shipped as far as 800 miles. This long shipment is the only objection to that system of making butter. On account of the scarcity of butter it was found that this poor cream, after it was made up into butter and shipped to market would sell for about the highest market price regardless of quality. Consequently this new system of making butter sprang up in that section of the country. The result was that the farmers did not ship the cream until they had a can full. It may have been one day old, two weeks, and in some instances the cream was a month old when it went to the creamery. Now, these are facts, and still the butter sold at a good price. Now, why? Because there was a shortage of butter. The result has created a tendency towards bringing this cream to central points. Not only that, but it has induced the local creamery man who formerly received nothing but absolutely sweet cream to receive cream of any age or condition. The public perhaps was satisfied; the butter concumers were perhaps satisfied with that kind of butter. If they were not satisfied at least they did not know where they could do any better, and the market, notwithstanding the fact that the butter was of a poor quality, kept rising higher and higher. During the last twelve months there has been a very rapid change. The change has been from poor butter to oleomargairne. Therefore poor butter is in direct competition with oleomargarine and I believe will sell at about the same price. As soon as the consumers purchased oleomargarine every pound of that stuff that was consumed replaced a pound of poor butter until we had a surplus of butter upon the market and today we have practically a panic. I have never seen conditions more unsettled in the butter market than they are at the present time.

Now, there is no use for us to deny those facts; we have to contend with them and what are we going to do? I see only one thing for the creamery man to do, and that is to put out a quality of butter that is not in competition with oleomargarine. That quality is good quality, and I want to tell you right here that oleomargarine will never be a competitor of good butter. Therefore, it behooves you here in the State of Pennsylvania not to fall into the rut that your brothers have in the West, but to keep up your standard and improve the quality of your butter. I feel sanguine that the conditions prevailing at the present time in the West are not going to be maintained. I feel satisfied that just as soon as the farmers in the West realize what they are up against that they are going to change their methods and bring this sweet cream to the creamery where they can convert it into sweet butter. A good quality of butter will then be made that will command a fair price.

I want to repeat again, canvass the situation and see that you make a good quality. If you do not, who is going to suffer? The consumer? No. The manufacturer? Yes, for a time he will. Who will suffer? The producer, the farmer; he is the man who is going to suffer; he will have to take less for his products. Now, it behooves the creamery men and you farmers to adopt such methods or continue such methods as will give you a good quality.

That is all that I am going to say in reference to the market conditions, except that a good quality of butter will always bring a fair pirce. When the supply of butter is extremely short, a fair or inferior quality sometimes may sell at a fair price, but as soon as the market is supplied, poor butter will not bring a good price.

I am going to score this butter and I would like to ask it as a favor of the buttermakers and creamery men to come in and take the front row of seats. I want to pass some of this butter to you so that you can examine it and see for yourselves the difference in the different samples. I believe among the number of samples we have here there will be considerable difference in quality; and I would also respectfully ask the gentlemen not to smoke, because the smoke and the aroma of butter do not mingle very well together.

The President: The creamery men will please take the front seats. We will pass the butter around as it is scored.

Mr. White: Now, gentlemen, I just want to explain about the scoring of butter. We can only score it by smelling it, looking at it, tasting of it and feeling of it. The smelling is for the purpose of getting the aroma. The tasting to get the flavor, and the looking to get the color, and the touching to determine the character of the body or grain. I should have said in connection with the tasting that you can also taste it for salt. The butter is scored on the basis of one hundred as perfection, of which forty-five points is set aside for flavor, twenty-five for body, fifteen for color, ten for salt and five for style. Now, included in this style would be the package itself and the packing of it; whether it is packed solidly or loosely; whether it is smooth or rough; whether there is enough salt—but each and all of these five points are included under style, yet it does not affect the quality of the butter. However, a nice clean, well put up package of butter will always sell better than one not well packed.

Now, as a rule, we are supposed to have the standard in our minds. The standard that I have adopted is ninety-three, because that is the quality of buter on the market which passes as "Extra." From that we work both ways. If better than that I will give it a higher score; if not so good it drops down lower. Now, that is the practice I have followed, and I presume that other butter judges do the same thing.

Now, in pulling a tryer you can determine something with reference to its body by noticing the character of the butter on the tryer. If it draws smooth, or if some butter sticks to the back of the tryer—I will have to admit that this is a poor tryer—it is pretty well corroded, and there are small rust holes in it, but I guess we will get along with it all right. You first smell the butter. If you pull a tryer from the tub and leave it exposed to the air for any length of time the aroma will evaporate. sConsequently that is the first thing to do. I will reinsert this.

(Another tryer handed to Mr. White.)

Mr. White: Yes, I would prefer this one. I will have to leave it in the butter for just a moment because it is pretty warm; it melted its way through the butter very quickly.

We used to bite out of a plug of butter. We call this a plug. The official orders, or instructions, to all of our men in the field are to discontinue that practice. We believe it is unsanitary and I hope that our Philadelphia friends will adopt the same method. I hope we may see the day when that practice may be discontinued upon all the markets.

No. 9.

Mr. White: Here is a piece of butter that has a very good aroma, the flavor is pretty good, the color is clear and of about the right shade; the salt is well dissolved, neither too high nor too low and so under those conditions what is that butter worth? Thirty-nine on flavor, the rest is perfect all the way through, 25, 15, 10 and 5. That gives it a score of 94 points, which, indeed, is very good. The only criticism I have to make is that it has a very slight wintry or cow-stable flavor, very slight indeed, so slight that it would not readily be detected. Quality of this character will sell upon any market at the present time at a good price.

After we find some of a different character, if we do, I want to pass it around so that you can have an opportunity of tasting it. If we find all the butter as good as this, I will be very agreeably surprised.

I want to say this about our scoring. We have gone into some States to score butter and we only scored once; we were never invited back, because it had been the custom in those States to have local men score the butter. They always scored it from about ninety-three to ninety-nine points. If we score it from about eighty-five to ninety-five the butter-makers are very much dissatisfied, and the State authorities think it gives them a black eye. Consequently they get some judge to score it high. Now, we have no objection to that at all, but we never score butter differently in one State than we do in another. It does not make any difference in Pennsylvania, Texas, California, or any other State, there is only one way to score butter, and that is to score it as nearly right as you know how. If the people are not satisfied with that, we cannot help it.

No. 13.

I will give this 40 straight. When I say straight the workmanship I consider is perfect. This is a very well-made piece of butter and is just a little bit cleaner than the other one, it hasn't that slight cow-stable defect. The way we start out here I would think you must have selected about a dozen of the best creameries in the State of Pennsylvania. How about that, professor?

Prof. Van Norman: We are not making any promises; we will wait until you get through. We hope they are all that way.

Mr. White: Well, now, this is a very nice piece of butter. I am not going to give you a sample yet.

Prof. Van Norman: We want something for contrast.

Mr. White: Yes, we want something that is decidedly different from those.

Prof. Van Norman: I do not think you have finished by saying that the division of the score card is 45 for flavor, 25 for body, 15 for color, 10 for salt and 5 for packing. When you say straight it simply means you give perfect on each of those points all the way down.

No. 10.

Mr. White: Here is another very good one, not much different from the rest of them. This is 39 on the flavor. There is very little difference between those three tubs of butter, very, very little, but this does not happen to come out of the same churning, because this is slightly mottled. We will give it perfection on body, half point off on color, salt is all right, and package we will not consider unless it is poorly packed or poorly finished off, because this is not the regular market package, as I understand it. Very little butter is packed in this manner except for exhibition purposes.

39, 25, 14½. I just want to draw your attention to one thing in connection with this package. The butter maker put in the paper lining and folded in over the edge like that. After the butter was packed into it and smoothed off he put the circular on before the edge was turned in. Now, that is not the right way. It is difficult for the buyer or anyone else to get the paper off and it might be torn and make a rough-looking package. It would be better to turn the liner down first and then put the paper on top. This one was put on right. If you will notice that was folded in and for a large tub it was folded in just about right.

The flavor 38 and the rest is all straight.

For criticism on flavor, I want to say this is about as clean as the rest of them, but has a distinct woody flavor which undoubtedly came from the tub, which was not properly soaked. That is especially true with the spruce tubs. If a spruce tub is not well prepared or paraffined the odor will penetrate to the center of the butter every time. Therefore, if you ship butter for inspection purposes I would advise you by all means to paraffine the inside of the cover as well as the tub, because the odor will go through. Now, this man lost at least one point or a point and a half on account of the woody flavor. I want this one to be compared with this other one here to show that woody flavor.

No. 12.

You will notice I have been eating practically all of the butter that I have taken off the tryer because it was good enough to eat. This is of a little different character. The flavor is mild, the body is a trifle pasty. I might add in connection with the flavor that it does not have that nice aroma and flavor that the others have. This shows indications of cream that was not strictly first class. But it is not bad. I would score this 38 on flavor, 24 on body, the color and salt is all right.

In body, I would say it is overworked, trifle salvy.

Still, we have not found anything startling so far as poor quality is concerned.

No. 15.

37 on flavor, body is all right, color is all right, salt is all right.

Now for the criticism. On flavor, high acid, slight cow-stable flavor.

Now, the high acid gives this a coarseness which cuts it down a point or two. As soon as you get above a certain per cent. of acidity you lose that fine, delicate flavor that you get in cream that is ripened at about fifty or fifty-five hundredths of one per cent of acidity. I believe that was ripened a little higher.

No. 14.

Still no change. 39 flavor.

I think I will have to commence to dish out some of these samples, Professor. I wish you would turn the print bottom-side up. There is some lettering on it. I don't know what it is, and I don't want to see it at all.

No. 8.

38, 24½, 15, 9½, 5.

Remarks: High acid, body a trifle loose; weak, you might call it. Salt not quite dissolved, althought it is not bad. I just want to draw the maker's attention, however, to the fact that the salt is not all dissolved.

Mr. ———: Taking it by guess, how much moisture would you suppose might be in that sample?

Mr. White: I have quit guessing, because whenever I tried to guess I was just as apt to be wrong as right, and perhaps more often wrong. Now I want to say right here, if there is a creamery in the state of Pennsylvania where the moisture test is not used you may get into trouble any day; perhaps not through winter, but more likely during the summer months.

Mr. ———: What per cent of moisture do you consider best?

Mr. White: It is very difficult to answer; it depends a good deal on the character of the butter fat. Some butter will retain more moisture than others, but we recommend moisture contents of about 14 per cent; that is 2 per cent under the standard.

The Internal Revenue Bureau provides that butter having over 16 per cent of moisture shall be classed as adulterated and the manufacturer thereof shall pay a fine of $600, and a ten-cent tax on butter so made, whether he makes one pound or more.

Mr. ———: What make of moisture test do you recommend? There are different makes on the market.

Mr. White: There are two which are largely used—one commonly called the Irish test, the other the paraffine, sometimes called Ames. The latter is the better of the two, because you do not burn the casine. If you hold butter over a direct flame you are liable to char the casine and drive off some of the volatile fat as well.

Now, you gentlemen have not had a bite of this butter. I am going to pass around some; we will put one or two blocks on. This is the one that is woody. I would like to have you take your knives and cut off a piece of both of these samples and see if you can tell any difference. The one with the highest color is the one that is a trifle woody, and yet there is not very much difference in the quality of any of those butters.

### No. 1.

36 on flavor, the rest is all straight. I am going to wait just a few minutes to give you an opportunity to taste this sample of butter before I give you a criticism. I will again lay the last one at right angles with the other. Now I would like to get up a little discussion on those three samples. I would like to get an expression on the last one; I did not announce the criticism on that. It is not bad at all, but there is a defect there; let us have the opinion of any one.

Prof. Van Norman: Call names if they don't talk up.

Mr. ———: I can't tell any difference.

Mr. ———: There is one that has a barn flavor.

Mr. White: That last one has what I term a feverish cow-odor. One or more of the cows from which the milk came is in a feverish condition. I migft explain that by the use of a homely phrase—it smell's like a cow's breath. It is not bad, but we took the first one we have had so far.

### No. 3.

36, 23; the rest is all right.

Criticism: On the rancid order. I have no doubt in my mind but that this butter will get rancid inside of a few days. It is slightly rancid at the present time, due to the fact that it is over-worked. Over-worked butter will go rancid and fishy very quickly. Now, this is salvy, greasy, and decidedly overworked. It is also very light in salt. This would stand one more per cent of salt. I believe the consumer would take it just as quickly and not say anything about it, possibly would prefer it to have more salt. Therefore the creamery that makes that butter will lose one per cent on account of light salt. You can figure out what that will mean in your business. Every ounce of salt that you add to your butter will increase the weight that much. Therefore, if you make butter that lacks in salt you will lose in weight. I do not believe in oversalting. Don't understand me to advocate extremely high salt, because we are having a very hard time to get some of the creameries to put in the right amount of salt. The tendency is to put in a large amount. A great deal of butter that goes on the market now contains between four and five per cent of salt. I dare say that that butter does not contain two per cent. I believe it contains less than two per cent of salt, and the maker certainly is losing.

No. 4.

36, 25, 15, 9½, 5.

Criticism: Coarse flavor and oily. Undissolved salt. I will give you my candid opinion with regard to the oily flavor of this butter. I believe the butter maker used rancid butter coloring. It tastes very much like it. Butter coloring should be kept in a dark, cool place. The oils from which it is made become rancid in hot weather in comparatively a few days. I believe that the coloring used in this butter was old and became rancid, and therefore it imparts that oily flavor. You want to try a sample of that. We will just pass this around hurriedly; that is the butter with the oily flavor, a trifle light in color and containing undissolved salt.

No. 2.

This is the first objectionable piece of butter I have found today. Some of the other had slight defects, but this is objectionable. This is made from stale cream. I am willing to stand back of that, no matter whether the cream was stale when it arrived at the creamery or whether it was made stale in the creamery. It is not a good piece of butter at all. It is 35—one off on body—and the rest is all right. Just mark that "Stale cream and over-worked."

We will pass this plate around; you can take your knife and taste a bit of that; possibly you can smell the bad aroma from the cream.

No. 5.

35, 24. Color is all right, but the salt is too high and undissolved, 9.

Criticism: Flavor very oily and body weak, salt too high and undissolved. Now, that too I believe is made by the use of stale coloring.

Mr. ———: To what do you attribute that oily flavor?

Mr. White: Stale coloring. Very likely that is the cause.

No. 6.

38, 24½, 15, 9. 5.

Criticism: High salt, the color is good, flavor good, but the body was over-worked. There are some good qualities in this butter, but it is covered up with high salt so that you get only the salt flavor.

No. 7.

Here is a sample like the first ones. We get 40 straight. It is a nice piece of butter. That is the only criticism I have.

Prof. Van Norman hands piece of oleomargarine to Mr. White.

Mr. White: Now, Professor, I have always refused, absolutely refused, to score butter that had any marks on it. This has a mark on it and I refuse to score it.

Prof. Van Norman: The law requires it to be marked and I could not help it.

Mr. White: If you would have taken that off and turned it bottom side up I might have thought it was sweet or unsalted and uncolored butter, but this little capsulea gave it away.

Now, this is a pound of oleomargarine with which goes a little capsule of coloring matter. The good housewise is supposed to take this pound of oleo, put it into a butter bowl or other dish, break the capsule and work the coloring into the oleomargarine.

You can realize that after such an operation, such a process, it would be a greasy mass. There is the coloring; you can see it. Now, if you want to taste that you can; I do not care to particularly. Now, I am sincere when I say this: oleomargarine is objectionable to me because of that raw cotton seed flavor; this exceedingly oily, natural flavor, which does not seem to agree with me. I cannot score more than about a half dozen samples of oleomargarine until I give it up. Therefore, I do not believe I will try this only to see what kind of stuff it is. There is nothing bad to the aroma; there is no aroma to it; nothing particularly bad to the taste, only it is soft and greasy.

Mr. ———: How does oleomargarine compare with good creamery butter in the line of food value?

Prof. Van Norman: Some of you are interested in this oleomargarine; pass it around.

Mr. White: If you will just give me your attention I will answer the question; it is a very important question. The gentleman asks how the food value of the oleomargarine compares with good creamery butter. So far as actual food value of any butter is concerned, it does not amount to a great deal. We do not buy butter for its food value. We buy milk and other atricles of food, but butter is really a delicacy and we pay for the aroma and flavor of the butter. Therefore some butter is worth ten or fifteen cents a pound more than others. If it were merely for the food value the poorest pound of butter that you can make may be as valuable a food or may contain as much food value as the best pound of butter. So I do not think that is a matter to take into consideration, because neither butter nor oleomargarine has been considered of any food value that you can speak of.

If there are any questions, I believe we have scored all of this.

Mr. ———: How is the milkman to preserve coloring so that you will not get the effect you have had in the samples this afternoon? He goes to the grocery store; the clerk may have it on the shelf for months. If he buys in large packages, can he keep it so that it will not develop the cause of that trouble?

Mr. White: Not very well. I believe the best thing a dairy man could do if he lived somewhere near the creamery man is to prevail on the creamery man to buy a small quantity of coloring.

Prof. Van Norman: How frequently is it necessary to get a fresh supply?

Mr. White: I believe you can keep coloring perhaps six months, if kept in proper condition, longer in the winter time. I do not believe there would be very much deterioration during the winter months, if it could be kept cool, although it don't want to freeze. In the summer season it might keep for several months provided that it is well corked so that the air does not get to it.

Mr. ———: If a person buys a package can he take out a small quantity from time to time and put back the cap without having what is left deteriorate?

Mr. White: Yes. You had better buy in small quantities, not over three to six months' supply at a time. I believe that would be safe.

I have been taking up a good deal of your time; I want to make a few remarks in regard to the general quality of this butter. I do not believe in flattering any one, but I want to say this—that it is very seldom that we find this number of packages of butter if such high quality. Now I am pleased to say that. I would be pleased to say it anywhere whenever possible. I can say that you have some very fine butter here, considering the time of the year in which it is made. Now, I don't know, Professor, whether we are to score off any ties or not; how about that?

The President: No ties.

Mr. White: If there are no questions we will quit the job; if there are, I will be glad to answer them if I can. If I cannot, I will be glad to say so.

The President: Are there any further questions you would like to ask Mr. White?

Mr. ———: What causes fishy butter while in the refrigerator, and how can we avoid it?

Mr. White: I cannot tell you, because we do not know what causes fishy flavor. I can tell you how to obviate it though, if that will do you any good. The Department has been carrying on experiments for some five years in churning sweet, pasteurized cream without the use of starter or without the use of any acidity whatsoever. All of the Navy's butter is now made by this process. The butter that the Navy uses is sometimes two years old before it is consumed. There is no known process that will give satisfaction besides churning sweet, pasteurized cream without the use of a starter or without ripening. I will go on a little bit further in connection with that. The milk or cream as it is received is separated and pasteurized and cooled down usually to a temperature of about forty to forty-five degrees, depending on the character of the milk and the time of the year. It is held until the next morning, when it is churned. The churning temperature may be all the way from forty-two to fifty degrees. Butter made in that way has excellent qualities and does not develop either a storage or a fishy flavor, but will remain sweet and without any change in it for a year or a year and a half.

Mr. ———: Do you make just as exhaustive churning?

Mr. White: Provided you hold it over night. We used to advocate churning the same day, and we got into trouble because in some cases where it was churned the same day the loss in the buttermilk was too great. Therefore, the creameries are now holding that cream until the next morning. Remember this, however, you must churn this sweet cream at a lower temperature than ordinary cream. Take from an hour to an hour and a half to churn it in order to get exhaustive churning and good butter.

The President: Any more questions to ask Mr. White? This is a very interesting subject, and I would like very much to have a few ideas crop out of this discussion. Are there any questions at all that enter your mind that you would like to have Mr. White answer? I know it would be a pleasure for him to do so.

Mr. ———: I would like to ask Mr. White the conditions that affect that moisture problem in butter? What conditions lead to extensive moisture condition in butter?

Mr. White: In a majority of cases, high churning temperature causes high moisture. If you reduce the churning temperature so that the butter will become firm, I do not beileve you will have any trouble.

The President: Anything further? Lots of room for discussion.

I would state, Mr. White, that you can come back to Pennsylvania again. I don't think there can be any objection as to the scoring here. There is one thing I noticed that you did not think about, and that is, that this is our thirteenth meeting and No. 13 sample had the 95 score. Remember that; I think 13 will be a good number for you.

Mr. White: Good; I thank you.

Prof. Van Norman: Possibly Prof. Larson will tell you about the educational scoring contest carried on at State College.

Prof. Larson: We have been conducting tests of this kind for the last few years, but last year we put on a new plan and had four contests. We used to have it every three months during the year. We had it divided into four tests. The plan of this test was to have butter makers send five pounds of butter. We sent out the tubs, paid the express on it and paid the express on the full tub when it came back. We sold the butter after it was scored and just about came out even on the sale of it. This butter was scored by one of the judges on the market. Mr. White scored several times, Mr. Friehofer, Mr. McAdam, and different judges. This butter besides being scored was analyzed and comments sent out to each butter maker who took part. Besides that, the Department made comments and suggestions as to the method of improving the butter. Everyone who got an average of ninety-one and no score below ninety received a diploma or certificate.

This same contest will be continued this coming season. If anyone wishes to take part he can do so by simply writing to the Department. Many think they have been greatly benefited by the test and a great many write they would like to have it continued. There is always an opportunity to ask questions; we send the butter maker a blank which he fills out and returns. This blank is always answered by someone in the Department. We keep a record of the over run and figure the over run on each churning. We require the amount of cream used in making the butter to be stated, and the amount of butter made. We then make suggestions as to the over run. I call 18 and 19 per cent. a good over run.

I would like to ask Mr. White while he is here to answer a question that is very often asked of us, and we answer it in our way. I would like to hear him express himself on it. He stated this forenoon that in the whole milk plan you do not get as much over run as in the gathered cream plan. Many butter makers have heard it and some of the farmers want to know why they should not be paid more for cream than milk?

Mr. White: As a general rule, milk that is delivered to the creamery produces a better quality of butter than cream. That more than offsets the difference in the overrun; therefore, I do not believe it would be advisable to make a difference in the price between the milk and the cream received.

Now, you may have some other reasons for that; that is one and it is a valid reason. As soon as the farmer buys a hand separator and delivers the cream to the creamery he seems to have trouble. Now, there isn't any real excuse for it, if the cream is properly cared for. It is too often true, perhaps, ninety-nine cases out of one hundred, that the hand separator is not washed every time it is used. Therefore, if a farmer should skim the night's milk with the cream separator and then skim the morning milk with a dirty separator there will be trouble and I dare say that is the cause too often. In fact, so far as we have been able to find out most of them do that very same thing. Such cream delivered to the creamery will make an inferior quality of butter to that made from whole milk. I believe that is reason enough why they are not paid any more for it.

The President: I will announce the following committees. We would like to have a report from these committees on Friday morning:

Auditing Committee: Messrs. Harrington and Knight.

Resolutions: Prof. Larson, H. W. Wolman, Mr. Hall, W. R. Perham, R. J. Weld.

Nominating Committee: C. P. Van Dyke, S. B. Henson, E. S. Minor, Jacob Hershey, S. S. Yost.

I would like to have those reports on Friday morning.

The officers to be nominated are President, Vice President, Secretary, Treasurer and six Directors.

I would also like to state that at the close of this meeting there will be a good roads meeting in the Board of Trade rooms. The Governor will be present, as well as the Supervisor of the Pennsylvania Railroad Company.

The banquet will take place at 8:30. The tickets, which are $1.00 each, can be secured from Mr. Norton. Right over here is our Secretary to receive dues. Reports of the last meeting of the Dairy Union are on the table.

We meet tomorrow morning at 9:30; have a joint meeting with the Live Stock Breeders' Association. The meeting will be held in the Chestnut Street Hall.

### Friday Morning, January 27, 1911.

H. L. Stokes, President of the Dairy Union, in the Chair.

The Chairman: You will please come to order. The first thing on the program for this morning is a symposium on the "Cost of Milk Production." The subject is to be opened by Mr. W. H. Palmer, of Kingsley, Pa. Is Mr. Palmer present? He does not appear to be. We will proceed with the next speaker on this topic, Mr. A. B. Huey, of Lenapa, Pa.

## COST OF MILK PRODUCTION

### A. B. Huey, Lenape, Pa.

Being asked to say something to you on the cost of milk production, I will first quote from the Thirteenth Annual Report of the New Jersey

State Agricultural Experiment Station, New Brunswick, New Jersey, for **the year 1909.**

Their cost for maintenance would be practically the same as ours, their cost of milk in cans at the farm is .0416 cents per quart. This is for actual cost of feed consumed and labor expended. It does not include anything for supervision, investment in the farm itself, dairy buildings, neither apparatus, milk utensils, incidental expenses, or insurance, and with cows averaging 8,561 pounds of milk per year.

I will consider this cost of milk production as that of the average farmer who raises the greater part of his own feed, and markets it through the cow. What can he do to cheapen the cost? In many instances where he has made a competency, he has done it either through more than ordinary judgment, or the strictest economy and hard work, often drudgery.

This reminds me of an instance where a farmer had bought a few cords of wood from a neighbor. When the farmer came to settle he mentioned the fact that in coming out with the last load two or three sticks had fallen off, and as he had on a heavy load he did not get off to recover them. He would therefore just take five cents off the bill. This man did not make that five cents, he only saved it, and so many milk producers are doing just as this man, only saving by the closest economy, which in most instances either is taken out of himself or some of his family. While I think it is often as important to learn how to save money as to know how to make it, I do not like to see the line too closely drawn, and I think that every producer when he comes to figure out for himself whether he is making any profit in the production of milk should take into consideration this labor account.

Having decided to go into this dairy business, one of the first things to consider it, how can I keep this cow profitably? How can I handle her milk satisfactorily, and how can I know a profitable cow? What shall I raise, and how can I handle it at the least possible expense?

Before buying the dairy herd, build yourself a silo, preferably of stone. Some kinds of silos are better than others, but any one is better than none. Not that more milk can be made with silage than with concentrated foods, but it can be made at less expense. Prepare yourself with a crop of any variety of corn, whatever will raise the most corn per acre in your locality, and do not make the mistake of so many and raise your corn too thick. I think it is clearly demonstrated that corn will not do well in the shade of a tree, and just in such proportion will it not grow in the shade of itself. Good corn, well eared, fully glazed and husks commencing to dry, just in proper condition for silage, will be one-third total weight of ear alone. How can we expect a fodder to take the place of feeding value of ear? Actual weights carried thorugh a series of years and with different kinds of corn have always shown the fodder in weight, not bulk, to equal or exceed that planted thicker, and always an excess of grain.

Do not be afraid of the stalk or ear being too large, as you can prepare yourself with a cutter that will handle them. Cut this corn as low to the ground as possible, thus doing away with any long stubble in seeding, and loss of valuable feeding matter in stalk. In the handling of corn from field to silo, many farmers add unnecessary expense, first by not having low-down wagons to haul this corn out, and second by carrying it or turning it half around to get it upon the cutter. At the end of the elevator or blower pipe, always have a hopper with a funnel hanging to it, and made in sections to injoint as you go up, to carry corn from hopper to bottom of silo. This always, insures an even distribution of your corn, avoiding all mould spots, caused in many instances by throwing bunches of leaves in one place, as is open the case in leveling with a fork. This shute always saves one man, as the person who carries it can both distribute evenly and tramp at the same time. I always advise the ramming of silage as getting it denser, thus avoiding all air spaces possible. Silage may be spoiled by leaving too much air in the corn in filling as well as from outside air. Just here I will say that a poor silo properly filled is better than the best stone one carelessly filled. Good silage should always be cold after the first heating has gone, as this second heating is the first stage of decay and should never be found when the work is properly done. Corn fodder can readily be kept in silo when properly wet and rammed. There has been quite a lot of experimenting in order to find something with more protein in it than corn, that is adapted to silage purposes, but all things considered I know of nothing so satisfactory as corn.

A great many are returning to alfalfa for protein, and justly. I must advise you to try alfalfa, since in many sections of the state alfalfa seems indigenous, and there is little or no trouble in raising it.

I suggest from my experience and observation that you can raise it anywhere if you will carry out the following: I prefer fall sowing, by this I mean August. Not that the alfalfa will germinate better, but on account of weeds smothering it out in the spring.

Have your ground deeply ploughed, with no vegitation to harrow up. Spread thirty-five to forty bushels of lime per acre or 1,000 pounds of ground limestone and 10 loads of well rotted manure pe racre on this ploughed ground before cultivation for seeding. This manure makes a mulch for seed germination which in no instance should be negelcted. I believe in inoculation where it is needed, and you can tell by the light, sickly color of the plant if such is the case. The proper way to secure inoculation is to plough up this some piece of ground each fall after second cutting until you have it.

Perhaps you have ground adapted and merely need a better stand. This can possibly be as well obtained by harrowing the ground deep after second cuting and reseeding. You need not be afraid of harrowing up the alfalfa or of covering it with dirt. I have seen a better stand apparently from the sprouting of the roots where the ground was ploughed than before the polughing was done. In my section we have as yet used the hay cap, but to a limited extent. For the first cutting this is a necessity. The alfalfa, where clear of weeds, may be put in small hand stacks with little or no wilting. These stacks every other day should be moved by two persons upon opposite sides, slipping them sidewise to fresh stubble. You need not be afraid of even the thinnest muslin hay crops, as they will turn the most severe weather and are no experiment. With an abundance of good corn silage and alfalfa hay you are as well prepared as you can possibly expect to be to keep the cost of milk production low as far as maintenance is concerned. What I have said in regard to alfalfa is equally applicable with our red clover, which makes a very good feed, and it or alfalfa is almost indispensable. While I have never done any soiling with alfalfa, some think it has no equal for that purpose. Both with alfalfa and red clover the most common practice is to let them get too old before cutting, a mistake which should be avoided.

Barns need not be expensive structures to insure health to the cows, but plenty of light with good ventilation is always essential. Where you are remodeling any barn it is a mistake not to prepare for ventilation. Do not place in the stable a lot of wooden stalls, which will never score high. Sanitary inspection is sure to come, so build with this object in view, and do not fret if you have been so short-sighted as not to meet its requirements. Stanchions I have no use for farther than it is possibly the cleanest tie known, nevertheless I would discard them on account of their being too confining for the very best results.

A gutter behind the cows or a platform upon which the cow stands is advisable. As I always think an ounce of prevention is better than a pound of cure, in no way neglect the clipping of the hair from the thighs, flank and sides of the cow in fall before stabling. This is a precaution in cleanliness not to be neglected.

The matter of something to wear both for the protection of your own clothing and from a sanitary standpoint is a perplexing one, and naturally to the initiated suggest white. Yes, white suits to milk in. That reminds me of what happened once when I went to inspect some dairies supposedly expected to wear white. In going through the barn I espied a nice closet with doors standing open. I suppose I looked rather closely at it as I passed, as the information was volunteered, that is the closet where we keep the suits, but they are at the house being washed. Friday noon, rather a peculiar time, unless washed every day, which was hardly likely. Another pause, when he said, to tell the truth, it is too damned hot to wear them. I admired this truthful statement. I have never seen anything more satisfactory than a bib apron similar to a cobbler's. It is made with a plait in the bib so that from the vent down it will lap about two inches and come below the knees. Always avoid loud talking or noise calculated to make excitement in handling cows.

For the ordinary dairy no manner of starining milk is quite as efficient as to have the common wire strainer bucket into which to pour the milk from the milking pail. This strainer removes any foreign substances which may have got into the milk. This bucket should be rinsed often when needed. I would strain from this bucket into a second wire strainer covered with two thicknesses of cheese cloth, and after cooling, pass the milk through a square of ordinary grade of canton flannel. I heard before this body last year the use of straining cloths the second time condemned as unsanitary, because not likely to be washed clean. There are so many other things besides strainer cloths requiring cleanliness that where a person cannot wash a cloth, I would condemn him as not fit to have charge of the cleaning of any of the dairy utensils. Some people cannot see dirt.

A milk cooler is an absolute necessity, and in nine cases out of ten is bought too small to get the best results. Philadelphia has just announced the requirement of a temperature standard of 60 degrees Fahrenehit, with a possibility that in a short time this temperature will go even lower. This will result in all small towns requiring milk to be cooled to a corresponding temperature. To meet these requirements successfully it is going to be a necessity to use ice. Preferably an ice and milk house combined. Undoubtedly the ideal situation for a barn or stable is a southern and western exposure, and one should never build anything on these sides to obstruct the sunlight. Our prevailing winds here are westerly, so we should whenever possible go to northwest corner of the barn for a milk house, and if you have this northern exposure, the milk house need not necessarily be taken far from the barn. Your ice house only for the convenience of the vault need not be near the milk house. Where you have the combination of the two together it makes the ideal way of taking care of milk that will meet all requirements, and with the minimum of expense. Your ice house should be built with a vault under it large enough to accommodate what milk you produce. On top of this vault should be a system of pipes with the ice resting on them. Two essentials are necessary—a supply of cold water on hand to run through the pipes and the pipes so arranged that the ice will not arch.

With such an arrangement you can be reasonably sure of drawing water at 36 degrees and cooling milk to 40 degrees. The temperature of the vault in which to place the milk until shipment should not be higher than 42 degrees Fahrenheit.

Some years ago the Dairy Division at Washington sent a man to make inspection and report upon a prominent creamery firm, as to why they were enabled to get more than an ordinary price for their butter. The report said that the superiority of this butter depended to a large extent upon the ability of the firm to find buyers to buy it. In my own observation there were two other reasons: Its absolute uniformity in texture and its splendid keeping qualities. These were in no small measure due to the care and cleanliness in its production, and the attractive manner in which it was always packed.

Can we educate ourselves to judge a profitable cow? Yes, to some extent, but we older ones will have to turn our education in another direction and make a positive record of her production before we can expect to succeed. I find many instances where even daily tabulation of milk production is made and the owner does not find time to make out the yearly production of any of his cows, with their butter, fat and feed records, without keeping an actual record of same, is under a delusion, and might as well try to keep in his head the account of the money paid his hired help. This work is a positive necessity, and if one does not find time to do it himself, he should turn to a cow testing association, by which in the majority of cases it can be done more accurately and cheaply than by the farmer himself who has a variety of other interests to look after.

Is not the fact significant that where Wisconsin with 998,000 cows has twelve cow-testing associations. Pennsylvania with 943,000 cows has but two?

Michigan with 563,000 cows—six cow-testing associations.
Maine with 173,000 cows—seven cow-testing associations.
Vermont with 107,000 cows—nine cow-testing associations.

I take notice that outisde of the corn belt they have been compelled to look for things to cheapen the cost of milk production, and naturally turn to the silo and dairy testing.

Just in the same proportion as the cost of this milk depends upon the little things that have to be done every day, so does the yearly record depend to as large an extent upon the persistency of a cow milking, as upon her to giving a large amount at the time she fershens.

The yield per cow must not be guessed at. The average per cow, census of 1900, for Pennsylvania is 5,160 pounds per year. Generally speaking, the cost per quart of milk increases as the amount produced decreases. In other words, a cow giving 10,000 pounds of milk per year will produce milk cheaper quart per quart than a cow giving 5,000 pounds.

In any case, low producing cows are expensive milk makers, and must be ousted from dairies where profits are made.

Successful dairying depends upon the quality, upon the ability of the dairyman to grow on his own farm the bulk of the feed consumed and upon the application of business principles to the industry.

The chairman: After this subject is thoroughly discussed by all the parties on the program we will then ask for questions, but not until that time.

Is Mr. Palmer present now? He was not present when first called. He does not appear to be, so we will call on the next gentleman on the program, Mr. George Abbott, of Philadelphia.

Prof. Van Norman: Mr. Abbott is in the South, but he has sent his paper to be read and I will read it.

Let me say that in making up that program the idea was to have a discussion. We hoped that we would have some figures on this subject, but Mr. Huey has very skillfully avoided giving any figures as to cost. Of course, it was not expected that the milk dealer would do much on this side, and Mr. Abbott has not. We had another dealer on the program, two milk dealers and two producers, and the hope was that would bring out something of interest along this line in figures. So it will be up to the folks here to furnish the figures. I will now read you Mr. Abbott's paper.

## COST OF MILK PRODUCTION

### George Abbott, Philadelphia, Pa.

My first-hand contact with the production of market milk ceased nearly forty years ago, but my relation to the subject from the standpoint of the retail dealer has continued, and has afforded ample opportunity for observation.

In the field of butter making, the buying of milk by the fat content, and upon market quotations, effectually disposes of all questions as to values, for the law of supply and demand is inexorable. Not so with market milk, and we suppose that it is this that is now primarily under consideration.

The failure of the corn crop throughout the United States in the year 1907 greatly accentuated the already steadily ascending price of all animal products, based as they are upon the cost of feed stuffs. Beef, mutton, pork, butter and cheese advanced in price by leaps and bounds. In Boston, New York, Baltimore, Washington and Pittsburgh, the price of milk advanced somewhat in sympathy with those conditions. This advance was as natural as the law of gravitation, and Philadelphia would have participated therein had natural law and sequence held. But there has been no advance in the retail price of milk in Philadelphia; it is furnished the consumer at the same price as it was eight years ago, and it is furnished below cost. As a result of this condition, the producer of market milk in Eastern Pennsylvania is selling his product at an unreasonably low price. Speaking roundly, the advance in the price of feed stuffs has been from 25 to 50 per cent, and the advance to the consumer in the animal products above recited, except milk, has been about 25 per cent, and in the case of milk in all cities but Philadelphia about 12.5 per cent.

As a general statement, milk has advanced from eight cents per quart retail to nine cents per quart in the cities of the East, excepting Philadelphia. The dairy farmers supplying these cities are receiving about all of this advance of one cent per quart.

The retail milk firm with which I am connected has for many years kept books in a way that gives close tabs on the cost of distributing milk, and the margin of profit in its sale. We have found this margin to be from a quarter to a half a cent per quart. The milk dealers of Philadelphia have for three and one-half years past paid the dairy farmer about one-half cent per quart more for milk than in the previous years, thus consuming all our margin of profit.

Besides thus giving up his margin in the business to the dairy farmer, the retail dealer has been and today is confronted with a constantly growing demand for large expenditure for the hygienic handling of the milk. Thus the dairy farmer supplying Philadelphia with milk is receiving a half cent per quart less than the suppliers of the other cities of the East, and the Philadelphia milk dealer is being ground to powder beneath the upper and the nether millstone set by these trade conditions.

No sensible person will claim that this is a reasonable state of affairs, and no honest consumer, believing in fair play between man and man, will take satisfaction in the one cent per day that each family is saving at such unbearable cost to those who supply them this common necessity of life.

But the general public is unreasonable. The average man is selfish and unfair. He will boast of the price paid for an oil painting, an automobile or a phonograph, and at the same time boast of the low price at which he has secured his transportation, coal, bread or milk—the common necessities of life.

The Philadelphia newspapers are largely time serving, bidding for popularity, and the temptation to take sides with the unreasonable and selfish portion of the community has proved to them irresistible.

For twenty years past, different newspapers of Philadelphia have from time to time made attacks upon the purity and excellence of the city's milk supply, and to this in measure we believe is due the fact that the use of milk is so small—only a half-pint per capita.

No one claims that the general supply is perfect, neither that it is as good as it should be, but had a spirit of fairness or an honest wish to improve conditions prompted these attacks, there would have been encouragements for efforts towards that end. But the slogan has ever been, "Down with the price!" "Down with the milk dealer!" And this although great pains have been taken to convince them that milk is no exception to the general rule, and that a fair price must be paid for a good product. When, in 1907, a prominent Philadelphia daily unscrupulously and virulently attacked the milk trade to prevent a just and equitable rise in price, unfortunately the Milk Shippers' Union was officered by narrow-minded, vindictive men who entered into a conspiracy with this prominent daily, and for two years opposed every effort to raise the price of milk at retail.

Under such an attack it was but natural that a large portion of the consuming public was aroused and quickened, and a state of mind engendered that would wreak vengeance upon any dealer who ventured to ask an increased price for milk.

Meanwhile, Philadelphia's Department of Public Health is feeling the pressure of the nation-wide movement for a more hygienic milk supply, but they cannot apply the requirements in force in cities where a reasonable price is paid, for fear of precipitating a milk famine. Dairymen will not bestow the expense and care requisite for the production of hygienic milk when they can just as readily drive to the door of the butter factory and receive as much for the product, and no questions be asked.

What is the remedy for this unreasonable and discouraging condition? It takes months to build a good barn and to fill it with the products of the farm, but the fool or the vicious can burn it in an hour. The damage to the milk trade is great and it will be hard to repair. The regeneration of those responsible for its undoing seems the first step for relief. The Milk Shippers' Union seems to have recovered in measure its sanity, and there is a light breaking, as of dawn, in the mental horizon with the benighted newspapers.

The Chairman: The next speaker will be Mr. Fred Stone, President of the Abington Milk Co., Scranton, Pa.

Mr. Van Norman: He wrote me that he was sick and unable to be present. Therefore, he had not prepared any paper.

The Chairman: Is Mr. Palmer in the room? Have you heard anything from Mr. Palmer?

Prof. Van Norman: Nothing.

The Chairman: Any further discussion or questions to be asked? It seems the other two speakers are not here. We will therefore go on with the discussion of the question. This is an important subject and I think there ought certainly to be some questions asked. Mr. Huey, I know, will be glad to answer. He is here ready to champion his cause.

Prof. Van Norman: I would like to ask Mr. Huey what are the important factors that go to make up the difference between profit and loss in the production of milk?

Mr. Huey: I am rather afraid you have me at a disadvantage today, coming up here to answer the questions of a professor of the State College; but as I tried to outline in my paper, one of the important factors in the cost of milk production is to keep your cow cheaply. I quoted figures from the New Jersey Experiment Station. In Pennsylvania we have all the advantages that they have, silage and alfalfa, but when you count the cost of labor against the cow you would not produce milk any cheaper in the greater portion of the State of Pennsylvania than in New Jersey. Probably the cost and the amount yielded per cow will be about the same as New Brunswick, N. J. In southeastern Pennsylvania, where we have a section, which is adapted to corn and a climate which is more favorable to dairying than many other sections of the state, we can no doubt produce milk at a less cost per quart, if we have the cows that are adapted to milk production. As an illustration, I see that at the New Jersey State College their cost for the amount of corn silage for the year was about $9.00 per acre per year. This present year I made a test on corn silage and the cost was about $9.20 per acre. It costs no more to raise twenty tons per acre than ten tons, and the same is true with alfalfa. I do not have the figures but I know there is no two of us producing milk at the same cost. Some of us may have the advantage of better cows and better judgment in their selection than others; and some of us are able in the section of the country in which we are located to produce the food at a less cost than others. Now, of course, we can go on and mention other things, but I haven't any special questions.

Mr. Perham: Tell us what your milk costs you as compared with New Brunswick?

Mr. Huey: I cannot. We just started this cow testing association. We have been in it personally for a little over a year and I was very much surprised to find that in my individual dairy, where I raised the cows, they ran from 3,000 to 9,000 pounds a year. Some that I thought would yield from 7,000 to 8,000 went down to 4,000, because the milking period was too short. You will be surprised that those you think the best cows may be among your poorest.

A Member: How is the best way of getting the cows—raising or buying, as most farmers do?

Mr. Huey: Well, now, there are many things enter into that, and one of them is intelligence. You had before you last year a man with superior ability in feeding cows, Mr. Edkins, and while I am not going to be a judge of the ideals of that man, he had the ability to select cows and the ability to care for them. I say it is almost impossible to set a standard which will fit every man producing milk. Where you have a man with a market for high-class milk and one who is producing such milk, you will find that his manner of feeding is such that it would not pay that man to raise cows. But the ordinary man with no judgment in the selection of cows,—I would in all cases advise him to belong to a cow-testing association or else buy a good pure-bred dairy bull and start with the best cows he can secure. He will then be sure of getting cows that will milk a longer period and give more milk. A great many of us who feed cows think we know more than any other man. I have been raising the great majority of my own cows for the last twelve years. Personally, I think it is better to raise your own every time. You will breed stock which is better adapted to this section and which you will take pride in, and that is the best stock for you to select.

R. J. Balderson: This last year we had five two-year-old heifers in the herd. We also bought a bunch of cattle, many grade Guernseys, the best we could get at the time. They were springers, not yet in profit, so we got them on an average of $65.00 apiece. The heifers at the present time are averaging a little longer period than the fresh cows and as I averaged it up the other evening they are giving one pound of milk more than the other cows. If you ask whether it pays to raise stock, this is our experience.

A Member: What do you figure it cost to raise those heifers?

Mr. Balderson: That is something I have no data on. It may cost more than $65.00 to raise to two years old, but you have two years' more use of them than the four-year-olds and you have to charge that up against the latter.

I wish Mr. Huey would give us some figures on the cow-testing association.

Mr. Huey: Our cow-testing association has not been in operation a year until June. I have no figures available from it.

Mr. Balderson: For last month?

Mr. Huey: I did not bring any figures for last month.

Mr. Seely: I would like to know if there is any place where they make a business of raising dairy cows to sell? Up in our neighborhood when a man has a cow to sell he wants to sell the poorest one, and he is in better condition to judge the best and poorest, so when we go to market we are confronted with the poorest proposition in the herd. Now, here is the breeding business: I believe there are sections where they are breeding especially for the market. There you can go and they will offer you the best they have got. I don't believe that is all because of the dairy business. I don't know of any more pleasant business. If there is, we will be pleased to hear. I have known these Wisconisn fellows to come down here and take two carloads of cows or more out to Wisconsin, grade Guernsey cows.

Mr. Wampole: Will you give us the average of the cows per day for feed?

Mr. Huey: In a general way, yes, sir; by figures, no. We feed at the present time about 35 pounds corn silage, 7 pounds clover hay, 1 pound of grain to three pounds of milk. That is a balanced ration. Of course, some cows are consuming more feed than others, according to the amount of milk given.

Mr. Wampole: Do you get any results by reducing or increasing your feed, especially in lactation?

Mr. Huey: There is no doubt you can increase your cost of milk and at the same time increase your amount produced. Now that is clearly demonstrated by Mr. Edkin's method last year. After the meeting last year we took up 12 cows and put on test. We increased the butter fat, we increased the amount of milk and we increased the flesh on the back. Now we are selling milk by the quart and we did not get the advantage of anything but the extra amount of milk. If we had had the advantage of the extra amount of milk, the extra amount of flesh and the extra amount of butter fat produced it would pay; but where we had but one against the increased ration it did not pay. Mr. Elkins was producing milk and changed about 75 per cent a year in the cows. He was getting the advantage of the beef and the amount of milk with the amount of butter. Of course, in this instance it would pay. But there is a certain limit beyond which we can be reasonably cautious. There is a certain limit to stop or we have no advantage but the amount of milk which we increase in the cow. I believe in feeding the cows the same the year round. That was formerly my method of carrying on the dairy business: whether fresh or dry she got the same amount of feed and she took on flesh when dry and took it off when milking, and I have considered that a cow in that condition if she was milking, she would possibly milk the flesh off again and that is the kind of cow we fed on that kind of ration which Mr. Edkins fed at Westtown.

A Member: Did I understand you to say you fed the cow the same amount of grain throughout the year, in pounds?

Mr. Huey: Yes, sir; that was formerly my method and that is the way the cows were fed on the Westtown farm.

A Member: What do you do now?

Mr. Huey: I told you what we do now; 1 pound of meal to 3 pounds of milk, with the balanced ration.

The Member: I think you meant to say you fed 1 pound of grain to 3 pounds of milk all through the year. Then you changed your ration?

Mr. Huey: We changed the rations.

A Member: When the cow drops milk in lactation, how is the feed to be cut down?

Mr. Huey: That is a question to which a great many met in our section will say no, and there have been men even in our cow-testing association who think that they want to feed the same the year round and some are. Of course, the cow-testing association—probably the majority know the workings under which it is done—they let every man do as he pleases and start to show him what he has done at the end of the year. There is no doubt where you have good silage you do not require any concentrated food with the silage to keep the cow in a thrifty condition. Now you must not omit the fact that silage is corn, that she is not cut down merely to a ration which would be a maintenance ration.

A Member: Do these feeders that maintain the same grain ration throughout the year have any trouble with milk fever?

Mr. Huey: Well, yes, they do. Of course, I have never had bother with that and I don't know that they do. The milk fever today I think is not much more looked at than garget or something of that kind. You know it is a common observation that a cow that had no fever when she freshened was perfectly worthless, and if she lived was worse off than if she died. It is not an uncommon thing to have a cow with milk fever back on ration and doing as well as before in three or four weeks' time.

Mr. Norton: For instance, a cow that is fed the year round, if they are good cows there is at least seventy-five per cent of them very hard to dry up. What would you do with that cow? Milk her through?

Mr. Huey: No, my experience has been that it is better to give her sixty days' rest if you can do it.

Mr. Norton: It is almost an impossibility to do that with a right good cow if you feed the same through the year.

Mr. Huey: Of course, when you commence to dry her up you have got to change the ration and bring down the amount, and if you watch your dairy herd rigidly you can have her in condition to calve.

Mr. Norton: I am one of the men that believe in feeding while the cows are dry, storing up some energy for the time they need it.

Mr. Huey: I guess the great majority of people today agree with you. We don't all do it. We all admit it is better to be done.

Mr. Comfort I was much surprised to hear of anyone having trouble with the milk fever in the East. For some of us it seems about as hard to cure as stomach ache in summer. The last few years the air treatment has saved all animals that have been sick in our neighborhood.

Mr. Eckert: It seems to me in listening to these discussions that one of the things that leads the average farmer, who has not been in the habit of doing these things, astray is the air of difficulty we throw around these different feed problems. I may be wrong, but that is my impression. At our farm the method has been that followed by Mr. Huey, having one pound of grain to three pounds of milk. Sometimes the farmer thinks you have got to weigh the grain every time you give it to the cow. We make up a balanced ration of grain which we don't change during the year. We have a box made that holds exactly two pounds of this grain, and then we string a wire in front of the cows on the feeding alley and we have a board on which are tacked cards that have the figures 1, 1½, 2, 2½, 3, 3½. I can take a foreigner into the barn and show him the box and the figures and he puts in so many boxes to each cow as indicated by the figures on the cards at their stall. We change these cards every two weeks. If the cow is dropping from 35 pounds of milk to say 30 pounds, she is reduced in proportion, so just as the cow begins to go back on us we begin to go back on her, and when she gets down close to the period when we ought to dry her up we start to cut off the grain entirely until the cow is dried off completely. As soon as she is dry, we start to feed four pounds of bran and one pound of linseed to meet the requirements Mr. Norton talks about, to put in good condition for maternity. It is wonderfully easy. Don't imagine that systematic feeding is a difficult proposition if you have some simple method like that. That is our way. It is an easy matter to have an entrance in the barn with the cards with the figures on and for sixty-five cows I can change all the numbers in a half hour. To be sure, I must know how much milk the cows are giving, but I take the milk cards and go through the barn and see what the cow has been giving and tack up a card to suit the requirement. The simplicity of the thing and its effectiveness is what I think should be impressed on any man who is interested in making the feed gas as far as possible. You won't have a cow go wrong on you, except once in a while you will probably have a cow that gets a little better in flesh than the rest and then give her less cornmeal. That is the one variation that we make; our herd is running close to 7,000 pounds; we have got a number of heifers in it and we think that is fair when the feeding is done mechanically.

Mr. Philips: I would like to say a few words along this line. It has been my experience in going around dairies and seeing the feeding done, that the best results are obtained by the ordinary farmer where he is in close touch with the individual cows, and where he does not intend to feed in proportion to the milk given. I think our larger records are made in that way, and the man doing his own work is generally in close touch with each individual cow and can feed that cow necessarily better than by set rule. I know there are some cows can make milk on less feed, because they will make 5 pounds of milk to every pound of feed they are getting; and by grading up in that way we are close in touch and I think the best results are obtained. I have told farmers that they could not pick out the best cows unless tested, and I believe it is true. Mr. Huey said in regard to feeding cows that sometimes the cows we thought the best were the poorest. When I started feeding cows I did not get far until I found that I was not getting what I wanted. I got a work on pure-bred cows and learned more about cows than I thought was in that.

I believe the salvation of the dairy farmer is the raising of his own cows. I think that at the prices cows are now he can raise them cheaper and get some that will do him good; but if you undertake to go to the cow sale you must get anything you can get and tuberculosis or anything else with it. The question was asked whether there was any section where they are raising dairy cows for sale. I don't know that they are raised especially for sale. I was out in Wisconsin last fall and learned that 700 carloads of dairy cattle were shipped out in one week and 250 grade Guernsey bulls in another one. I know a man in Des Moines, Iowa, that buys carloads and carloads of cows in the section around Philadelphia and sold him some. Common cows sell out there for as high as $140. He offered me $100 for a common cow last June which was 12 years old. These are the prices that western men are up against. What are the eastern men going to do if they don't raise their own cattle?

The Mayor of Philadelphia has appointed a committee to look into the sanitation of milk and they are about ready to turn in their recommendation. The milk dealers wanted them to recommend pasteurized milk, but they would not do that. It is a simple way of covering up all the dirty milk they are getting and getting it off their hands.

There is a movement now to change the testing of cattle for tuberculosis and I don't know what that will do, but it is being strongly advocated to make it so that every transfer of ownership of an animal must be accompanied with a tuberculosis test and in that way insure healthy cattle. It is important to profitable dairy cows. If you have a cow diseased, she cannot make profitable milk, and by requiring such a test we are bettering the farmer in the end. I have not found a single man that has tested his cattle who has not been well-pleased after he got started again, while his entire herds have been lost too.

I think this discusison leads very largely along market milk; that there has been injustice done all along to the producers, and that they have not received what they should for their milk. Skim milk is added to cream and sold as cream contrary to law and the milk is kept as long as possible by pasteurizing of kept with preservatives. That is done to the detriment of farmers like us, and they take a half a cent off the farmers for the whole milk. This is working against our farmers. I think something should be done to remedy that practice. There was a time here this fall when more skim milk was going into Philadelphia than whole milk.

Mr. Brown: If we can extend the discussion to the cost of butter production we have Mr. Smith here who can give us some figures on the Cost of Butter Production.

The Chairman: Mr. Smith has been called upon and we will be pleased to hear from him.

Mr. Smith: I did not come here with the expectation of making any statements, still I have a few figures. I have been keeping a record for some years back with my dairy. In fact, I started some 15 years ago with a grade Guernsey cow I bought for $30.00 at a sale and from that cow I graded up, always using a pure-bred bull, until last year I had cows making a record of 456 pounds of butter fat per year, one cow; and as well as making good butter fat this year, I have six cows that in nine months gave me about 6,000 pounds of milk apiece. I have just a few figures. They only run over nine months; this year's record beginning April 1st and continuing to January 1st. Probably the part that would would interest you the most is that my commercial feed in that nine months for fifteen cows has cost $380.00, or $25 1-3 per cow for nine months; that is, commercial feed. In addition to that I am feeding ensilage for half that time probably and the cows are on pasture the rest of the time, feeding some with hay and second-crop hay. In my year's work, in counting the feeds of the cows if I put so many loads of hay or second-crop hay in the mow I charge it to the dairy. I don't weigh what they eat each day or each feed, but it shows the year's work in that way.

As to milk-testing associations, I have two cows that have been tested since the 1st of April for the advanced registry and the tester that comes there is required to be there two days. While he was there I made use of him in testing all my grades and in that way I think I can keep a pretty correct record of what they are doing. I have not the record with me, but in that nine months from fifteen cows we have churned and put to market 4,292 pounds of butter. In giving the dairy average for the butter we don't give that average for the full price we get. The highest price we average is 37c, while at the retail market at Philadelphia it is bringing 43c. The lowest price has been 32c. Last year's work, after counting all the feeds we raised ourself and the commercial feeds that we bought and charging the labor and also giving credit for the manure, my profits were $50.00 per cow. Last week I had the tester there. The lowest test in the herd was 4.90 for one cow and the next lowest 5.20 and I have cows running from that on up. I may say the cow I bought for $30.00 and started with was from a man who was selling out Jersey and grade Guernseys. He brought a sample of milk from each cow to Philadelphia to have tested so that he would know which cow to sell and this was the highest test in the flock. He thought she did not give any milk, and he would not keep that cow, so he sold her to me. Her offspring, children and grandchildren and great-grandchildren have all been testing 5 and over right along. In fact, a granddaughter was tested last week, when milking ten days only, and her test was 5.30. She was a heifer with second calf and at that time giving 28 to 30 pounds of milk a day and had only freshened ten days before. I think it is an advantage for dairymen to raise their own stock, as I have proved conclusively in my own case, and, of course, we have the skim milk there all the time to feed the calves. We feed on skim milk until four months old. I may add further, I have been feeding six heifers in addition to my milk cows, and I simply feed the heifers, so that three heifers get about the same amount of feed as one cow. I have not been following it closely because I don't know how many pounds of milk the cows are giving. In other words, I feed for butter fat rather than milk. Some cows not giving as much milk give more butter fat. That is what I am after and feed for and in my feeding operation I try to feed a cow such a ration as will keep her in average flesh; if laying on flesh faster than she ought I cut down or if losing flesh I add a little fat to the feed.

Prof. Van Norman: I would like to add to this discussion a little bit by emphasizing two or three things in connection with this discussion on the cost of milk production. It was brought out right here this morning and it is brought out repeatedly in different meetings I have been to and by different men I have met, that when you find a man who don't spend all his time with a sickle, shovel and pitchfork, who is not kicking about the high cost of milk and no profit in farming, he is getting some accurate figures. You find a man that has demonstrated that he can produce milk at a profit. The lesson I get out of that is this: that the only salvation for the dairyman today is for him to be so constituted that he will get some accurate figures on what he is doing. If he is so constituted that he cannot get figures I see absolutely no hope for him, because I never yet heard in meeting or out of meeting of a man that has been making a big profit who cannot give figures. One of the things we learn in the educational work is to think, and I find that the fellow who thinks can argue forward or backward from a given point and I argue this way, that the men who are making money always have figures and the fellow that cannot make money rarely has figures. There must be some relation between figures and money, and I say the only salvation I see is for the men who are getting at this thing is to figure. When he does get to figuring he is going to find out a few things. One of them is that some of his good cows are only giving from 3,000 to 4,000 pounds of milk a year and there is no question about it that you cannot make a profit on a cow that gives but 3,000 pounds of milk a year, in any market in Pennsylvania today. There are not many in the State of Pennsylvania having cows producing 4,000 pounds of milk a year can make a profit on those cows if they charge up the labor.

The other thing was hinted at but not emphasized, as I hoped. One said that it cost very little more to produce a crop of silage that produced twenty tons per acre than it did to grow one that produced but ten tons. In that truth, gentlemen, is the foundation of profit in all farming, and in the feeding of the cow. It takes the first tons of silage to pay for the labor and it is not until you get more tons of silage to the acre than will pay for the labor of grawing corn that there is any profit in silage, and the same is true of the cow. It is not until she has produced milk enough to pay for the feed and labor and interest that there is any profit in the milk, and that takes more than 4,000 pounds. A representative of the Borden's Condensed Milk Company recently told me that they have figures of the milk production on over 4,000 farms in the State of New York. I think it was for the last twenty years. They know how many cows have been kept on those farms; they know what the average production per cow per farm is on the farms that supply them. That is the way the Borden Company makes money, by having the figures and knowing what they are doing. They know their business and their farmers' business. Not only are they able to fix the prices but see what the farmer can do because they know more about it than the farmer himself. They see that on those farms where the average is over 6,000 pounds per cow per year the farmers are making a reasonable profit and are reasonably satisfied and contented and going on with the production of milk; that on the farms where the average is less than that there is not only discouragement and dissatisfaction, but they are actually going out of the milk production business so fast that the Borden people are troubled to know where to get the amount of milk needed to furnish their customers in New York City. They can sell more milk in New York City than they can get; therefore their problem in New York and eastern territory is to get milk enough to meet their trade and they are limited because lots of the producers are going out of the business because they are not making a profit and the reason is that they are keeping poor cows. And so I say to the Pennsylvania farmers, that I believe that the solution of this proposition is the first-hand knowledge of what we are doing, because there are cows that will make a good profit at present prices, and I would not be a bit surprised if you will find that often there is actually more profit on the best 30 cows in a herd of 50 than there is on the whole herd. There are lots of men who will find they have been supplying the trade for glory instead of profit and that while not selling as much milk from 30 cows as they did when they had 50 cows, they would be much better off with the best 30. Get the facts. Somebody has got to supply the trade with milk from somewheres. What we are after is profit. That is what we have to have. There is many a fellow when urged to have his cows tested will say: Then I will have to sell my poor cows and not have enough milk to supply my trade. That is the argument over and over. It may be that he is under obligations to furnish a definite number of gallons of milk. I would cut out that obligation quick if I could not meet it and make profit; better make less milk and keep fewer cows and have a profit left. The only way is to get the figures of how much the cows are producing and what we are paying for the feed and labor. This feed proposition—the first thing you have to do is to keep the cow alive and it takes approximately the same amount to keep each cow going. After that all the good feed you can get a cow to eat up to the point of getting fat goes into milk production, and if you have got a cow that eats three times as much over maintenance as another cow she will make three times as much milk, but if the extra feed goes into body fat it does not count in the milk pail. It is the quantity of sialge raised over and above the cost of labor that makes the silage cheap food. It takes just as long to feed a poor cow as a good one; as long to haul the manure out from a poor as a good cow. We have got to get a surplus over and above cost and the place to commence to figure these matters is at home. A great many farmers in Pennsylvania do not take time to consider. What we need on many farms is to get one more farmhand, even at the prices you have to pay today, and then let the owner spend five hours a day using his wits and let the farmhand do the work he would do with his hands. That farmhand may cost 50c or maybe a little more, but the man who is feeding thirty or forty cows will have time to use his wits and an hour spent in watching the men plowing or feeding, or studying the cows, or how to save time for the other men will earn several times 50c. He will study the amount of time to do the chores, see to getting the maximum amount of results in a given number of hours. That is head-work and few men can do that head-work and do a day's work with their hands also. There are farms where it is not practical to do this, but many where it is, and the man who can do it can make money and profit by producing good cows and selling milk at present prices and can make a large individual volume of milk from the cows he keeps and not dilute the herd with the poor cows. The cow testing association is simply a book-keeper hired to do the figuring which you often cannot or do not wish to do. We cannot successfully conduct any other business today without a book-keeper and we must keep strict account in the dairy business also. I want to emphasize this point, that it is business methods and exact knowledge of detail costs we must have to be successful. (Applause.)

The Chairman: We will have to go on with our program. Is Prof. Kelly ready to make his report?

Prof. Kelly: At your pleasure, Mr. Chairman.

The Chairman: Ladies and gentlemen, I have the pleasure of introducing to you Prof. A. C. Kelly, of Washington, D. C., who will make his report on the judging of the milk and cream exhibits.

## REPORT ON MILK AND CREAM EXHIBITS

### Prof. A. C. Kelly, Washington, D. C.

Ladies and Gentlemen: I am sorry that I have not been able to report on these milk and cream samples before, but milk and cream are not judged as easily as butter is. It takes some time to do this. I got to town Sunday night and, commencing Monday, I have been working on the milk and cream samples and just got finished this afternoon.

Now, we have had upstairs fine exhibits of corn and fine exhibits of fruit, but I want to say that the man who exhibits good, clean milk—or rather the man who produces on his farm good, clean milk—is one of the mose peaceful citizens in this community. Now, fruit we may regard partly as a luxury, but milk is an absolute necessity. Milk is used not only for adults, but it is the sole food for a great many children, so that the man who produces clean milk is not only a useful member of the community, but a true scientist; so many things enter in the production of clean milk and good milk, chemistry and bacteriology, that the producer of clean milk is a scientist.

Now, in the certified milk class the farm scoring the highest rating was the Willow Brook farm, at Willow Grove, where they scored 96¾ points. In the market milk the highest rating was scored by the Pencoyd farms, with a score of 96 points out a possible hundred. The second place, or those receiving honorable mention with milk, and that means a score of over 90 points out of a hundred, were S. E. Morse and Son with a score of 94, J. L. Balderson with a score of 93¼ and J. R. Kendig with a score of 90¾. In the cream, the man having the highest scoring cream in the contest was S. E. Morse and Son with a score of 94 points out of a possible hundred.

Now, may I have a few moments to explain the method of scoring?

The Chairman: Go ahead.

Prof. Kelly: I have here some of the milk that was entered in the contest. There is the certified milk that won the first prize. Here is the market milk that won first place; and here is the market cream that won first place.

Now, the keynote of all these meetings this week has been quality. Milk is one thing in which the quality has been neglected for a long time.

And what do we mean by quality in milk? Some people may say, the amount of cream or butter fat—I have heard people passing the exhibits upstairs and looking at the cream around the top of the bottles say "That is fine milk. Look at the cream on it." We know now there is a great deal more meant by the word "quality" as applied to milk than mere composition. We know that cleanliness is of prime importance. There are two reasons: first, the sentimental standpoint, and, second, what I call the economical standpoint. The sentimental standpoint has to do with the danger from disease from dirty milk, but I won't touch on that because our time is so limited tonight.

The samples are scored on a basis of one hundred points: 35 points are allowed for bacteria, 25 points for flavor and odor, 10 points for fat, 10 points for solids not fat, 10 points for freedom from possible sediment in the bottom of the bottle, 5 points for acidity, and 5 points for appearance of bottle and cap. I just want to run over briefly what goes to make these points. First of all, the flavor and odor are influenced by several things. They are influenced by bacteria. I have a sample here which any of you that are interested can smell after this meeting is over. That has a very putrifactive odor. Here is another sample. This has a clean, sour odor. This has a different class of bacteria working in the milk, and bacteria govern the different odors before the milk is sterilized. This one here has a smell that comes through feeding bad silage or feeding at the wrong time or way. The time to feed silage or any other feed of that kind is right after milking and then the odor has time to be distributed before the next milking. Care should be taken when the feeding silage to sweep up all that is scattered about after the cows are through and never leave any silage laying about the barn.

The question of bacteria—what are these bacteria? They are little spores and they fall into the pail and they need warmth and food and moisture for their growth. They find all these elements in milk and as soon as they fall in there from the dust of the cow's body they start to grow and multiply, some of them once in every few hours and unless the milk is cooled down immediately the work goes on energetically and very soon reaches enormous proportions. So we must keep the dirt out of the milk in the first place and cool the milk right down to check this bacterial growth and keep the milk clear. Now, the dirt and bacteria come from the cow, the stable, air, or barn. There is dirt and dust sifts down from the hay overhead and when the cows are not brushed off, we get contamination from them. Then sometimes we do not have the platform the length of the cow; the cow gets back to the gutter; and the gutters are not deep enough. The gutters ought to be built deep enough so that the cows will keep clean; we ought to use clean bedding; and the walls and floor ought to be as smooth and clean as possible. You may say that is folly and it will not hurt the milk. It is going to make the work of keeping things clean easier if the walls and floor are smooth. It does not cost very much to build a barn where sanitary milk can be produced. It does not take a rich man to build such a barn. It costs the same as other barns. It has just to be plain and simple with no disease catchers and no dirt catchers. The manure wants to be taken away. One of the greatest wastes on the farm is right in the manure pile. It should be taken right out on to the fields at once. If the manure is piled up against the barn and there is water running through it, we are losing fertilizing value from it.

There are so many more things I would like to touch on—the milk house and cleanliness of milk. The worst faults I found with these: the acidity was all right, the chemical composition was all right, bacteria was pretty fair, but the flavor and odor are pretty badly off on the majority of the samples. There were some very good ones there, some better than I have scored anywhere else this fall on flavor and odor, but this is a very general defect; and then the bacteria, the scores did not run very high. The Pencoyd farm and S. A. Morse and Son make the highest score in bacteria in milk and S. A. Morse and Son for bacteria in cream.

A Member: Does that mean the fewest bacteria?

Prof. Kelly: The fewest bacteria. For flavor and odor the Willow Brook farm had the best flavored milk in the exhibit. The Pencoyd farm and S. E. Morse and Son with their cream were second. Freedom from possible dirt in the bottom of bottle, J. L. Balderson had the best sample on the exhibition. No matter how carefully you think you strain the milk, just let it stand a couple of hours and pick the bottle up and look at the bottom and see if you can see any sediment. Any specks in the bottom of the bottle will debar you from a perfect score under the head of dirt. Some of the bacteria count ran very high. Our perfect score for bacteriais only 400 a cubic centimeter. Certified milk agents usually require 10,000 or less, so that you see a score of 400 is mighty fine. The highest score we had was 374,000 and we had one of 5,000 and one of 16,000, another of 23,000, and one of 52,000, so you see we had at least five or six samples that more than beat the standard for certified milk. So that on the whole the bacteria counts were good. The certified score of 90 made by the Pencoyd farm is an exceptionally high score and denotes a superior product, and all those men who received 90 points or over are to be congratulated. They have accomplished a great deal, those who are in the 90 class, the honorable mention, and I do not want them to feel discouraged. The value of a contest is twofold: it is primarily educational, and at the same time it has a commercial value. I have two letters received the other day after a competition, one showing the educational value in which the writer notes that he lost on odor and that it was due to the manner of feeding at the time of milking. This man learned a lesson from that condition. We talked to him afterwards just as we have done here tonight. The next competition he goes into he will know how and when to feed in order to make good on the flavor and odor. The other letter shows the value of these competitions from an advertising standpoint. The writer says that the next morning after the announcement that he had won the people came from every direction to congratulate him on his success. He says he had not expected to win among older and more experienced dairymen, but that he was very much gratified and had learned where he could make still more improvement. So we have two letters received, one showing the educational value and the other the commercial value of these contests. (Applause.)

Prof. Van Norman: Mr. Chairman, while the people are all seated I would like to have them smell the difference in these two lots of milk, and on the strength of what the judge has said I want you to know the difference. Lots of people who have not examined the milk from different herds do not realize how different the two lots are. Smell the one and then follow with the second and those of you whose nose is working will note the difference and for the rest of you there is no hope. (Milk samples passed around.)

A Member: Might I ask if they were scored on the same score card, the certified with the market milk?

Prof. Kelly: Yes, we use the same card for all. The appearance is judged whether a dirty bottle or on this outside cover. Not only the outside cover adds to the looks of the package but adds to the value of it. We want to provide against dirty water running onto the cap or down the bottle. The paraffine on top of the cap and bottle as used here adds not only to the looks, but to the sanitary value of the package. I have some of the bacteria plates made from the milk. Each one was made from two-tenths of a drop of milk. You can see white dots on them. They represent the bacteria. If you want to you can take the lid off and smell them.

The Chairman: The time is up for this most interesting subject.

We will call for the reports of committees. The first will be the report of the Committee on Resolutions of the Dairy Union.

Mr. Hall then presented and read the report of the Committee on Resolutions as follows:

## Resolutions of the Pennsylvania Dairy Union.

Whereas, The Dairy Division of the United States Department of Agriculture has rendered valuable assistance at our meeting by sending Mr. B. D. White and Mr. E. Kelly to address our meeting and score the butter and milk.

Resolved, That we hereby tender our thanks to the Secretary of Agriculture for this valuable assistance.

Whereas: The State Department of Agriculture under the direction of Secretary N. B. Critchfield and his able assistant, A. L. Martin, have rendered valuable assistance to the dairymen of the State:

Resolved: That the thanks of the Association be extended to these gentlemen for this good work.

Whereas: Mr. S. F. Barber has so ably taken care of the local arrangements, making successful the exhibits of machinery, butter and milk:

Resolved: That the thanks of the association be extended to him.

Whereas: The Conference Committee on the control of tuberculin testing has not completed its work, be it

Resolved: That the same committee be continued.

Whereas: The dairy interests will be greatly benefited by the holding of a State Fair.

Resolved: That the Dairy Union favor the passage of a bill creating an annual State Fair.

Whereas: The holding of joint meetings has been so successful:

Resolved: That we recommend to our officers that this practice be continued.

Whereas: There is great need of instruction work among the dairymen of the State;

Whereas: Other of the leading dairy States have been greatly benefited by educational work in the dairy industry;

Whereas: State College with its corps of trained instructors is amply competent to take up the work of carrying on co-operative feeding experiments that would suggest to the milk producer better methods of feeding; the organization of self-supporting cow-testing associations which would show the profitable and unprofitable cows, eliminating the unprofitable cows and thereby increasing the net profits of the dairymen.

The investigation as to how the kind of milk required by our cities can be produced at the least cost in investment and cost of operation.

The instruction of butter makers in the best methods of manufacturing butter.

Whereas: Additional funds to State College will be necessary for the carrying out of this work:

Resolved, That we urge the appropriation of sufficient funds for general extension work.

C. W. LARSON,
HENRY N. WOOLMAN,
R. J. WELD,
W. E. PERMAN,
R. C. HALL.

The Chairman: Gentlemen, you have heard the reading of the resolutions. If there are no remarks or objections they will stand approved as read and the committee be discharged.

The Auditing Committee will next make their report.

A Member of the Auditing Committee: It seems the other members of the committee have gone home and we have no report made up. We have not got all the items yet.

The Chairman: The amount of money received and amount of money expended?

The Member of Committee: It is $711. Some is on hand.

The Chairman: Will you please make out your report more explicitly and have it placed on the record? We will continue that committee.

Secretary Van Norman: I would like to add for your information that the Treasurer's Report shows that the receipts by the Dairy Union have been about $1,300, including that from the State, and that the disbursements have been about $600 for the past year. That does not include accounts payable. There are some that will reduce the balance more or less.

The Chairman: The Committee on Nominations will please report.

Mr. Miner presented the Report of the Committee on Resolutions, as follows:

### Report of Committee on Nominations.

We, your Committee on Nominations, beg leave to respectfully nominate as follows:

For President—H. M. Stokes, Hanover, Pa.
For Vice President—M. T. Phillips, Pomeroy, Pa.
For Secretary—H. E. Van Norman, State College, Pa.
For Treasurer—W. D. Marshall, Lyndell, Pa.
For Directors—W. E. Perham, Niagara, Pa.
A. B. Huey, Lenape, Pa.
R. J. Weld, Sugar Grove, Pa.
D. R. Stephens, Sayre, Pa.
George G. Paxton, Huston, Pa.
Henry Woolman, Philadelphia, Pa.

(Signed) E. D. MINER,
S. T. YOST.

The Chairman: You have heard the report. What action will you take on it?

A Member: I move the report be adopted as read.

The motion was seconded, put and carried.

Mr. Norton: Gentlemen, the right way is for the Committee on Nominations to present their report and then to make it legal there should be a motion made to authorize the secretary to cast the ballot for the gentlemen nominated.

Secretary Critchfield: I move you, gentlemen, that your secretary be authorized to cast the ballot for the gentlemen named by the committee.

The motion was seconded, put and carried.

The Chairman: Prof. Van Norman, our secretary, is authorized to cast the ballot for the gentlemen named by the Nominating Committee.

Secretary Critchfield: Mr. Chairman, if there is no objection, I would like to amend my motion by saying that Mr. Norton shall cast the ballot, seeing that your secretary is a nominee.

Mr. Norton: Gentlemen, I cast the ballot for the nominees named by the Committee on Nominations.

The Chairman: I declare the gentlemen named by the Nominating Committee elected to their respective offices.

Is there any other business before the Dairy Union? Do you know of any new business, professor, that we have forgotten? If not, we will close the Thirteenth Annual Convention of the Pennsylvania State Dairy Union, and we want to thank everyone for their kind attention and for help in making it a success.

Secretary Critchfield: Before you declare the meeting adjourned permit me to make an announcement. I would be very glad to meet the officers of the Dairy Union and State Livestock Breeders' Association and the Horticulture Society for a little while at my office before we finally part.

The Chairman: At what hour?

Secretary Critchfield: Say one o'clock.

Prof. Van Norman: Mr. Bayard is going out at half-past twelve. Would it not be convenient to meet as soon as the officers of the Livestock Breeders' Association are elected and their business concluded?

Secretary Critchfield: That will be the arrangement. We will meet immediately upon your final adjournment. Adjourned.

## EXHIBITORS AND SCORES

**Exhibitors, 1911, who received a score of 90 or above.**

### Creamery Butter

| | |
|---|---|
| Ephriam Zug, Prescott Station | 92 |
| Harry E. Ott, Wismer | 94 |
| W. D. Marshall, Lyndell | 93½ |
| Otis Blish, McCall Ferry | 93 |
| Brandywine Dairies, West Chester | 92 |
| O. D. Mott, Edinboro | cup 95 |
| Guernsey Creamery Co., Guernsey | 94 |
| H. H. Stivel, Quakertown | 92 |

### Dairy Butter

| | |
|---|---|
| S. E. Morse & Son, New Milford | 91 |
| Horace T. Smith & Son, Buckmanville | 90½ |
| Austin Leonard & Son, Troy | 91½ |
| White Horse Farm, Paoli | cup 95 |

### Market Milk

| | |
|---|---|
| S. E. Morse & Son, New Milford | 94 |
| J. L. Balderson, Kennett Square | 93¼ |
| John R. Kendig, Pomeroy | 90¾ |
| Pencoyd Farm, Bala (Silver Cup) | 96 |

### Market Cream

| | |
|---|---|
| S. E. Morse & Son, New Milford (Silver Cup) | 94 |

### Certified Milk

| | |
|---|---|
| Willowbrook Dairy, Willow Grove (Silver Cup) | 86¾ |

## LIST OF CREAMERIES AND CHEESE FACTORIES IN PENNSYLVANIA

**Co-operative Creameries—**

Britton Run Co-op. Creamery, Spartansburg, Pa.
Clinton Creamery Co., Creamton, Pa.
Church Creamery Co., R. D., Knox, Pa.
East Rush Creamery Co., East Rush, Pa.
Franklindale Creamery Co., Ltd., R. D. 8, Towanda, Pa.
Farmers' Co-operative Creamery Association, Milnor, Pa.
Hadley Creamery Co., Inc., Hadley, Pa.
Montoursville Co-op. Creamery Co., Montoursville, Pa.
Little Cooley Creamery Co., Little Cooley, Pa.
Manheim Condensed Creamery Co., Manheim, Pa.
New Bedford Creamery Co., New Bedford, Pa.
Nununedah Creamery Co., Smethport, Pa.
Quarryville Dairy Co., Quarryville, Pa.
Red Oak Creamery Co., R. D. 84, Spartansburg, Pa.
Silver Spring Dairy Co., McCall Ferry, Pa.
Sparta Creamery Association, Spartansburg, Pa.
Spinnerstown Dairymen's Association, Spinnerstown, Pa.
Spring Brook Creamery, Dyberry, Pa.
Fairdale Co-operative Creamery, Fairdale, Pa.
Fairmont Creamery, Font, Pa.
Fairview Village Creamery Association, Fairview Village, Pa.
Alba Butter and Cheese Mfg. Co., Alba, Pa.
Auburn Four Corners Creamery Co., Auburn Four Corners, Pa.
Austinville Co-operative Creamery Co., Columbia Cross Roads, Pa.
C. Z. Beiler Creamery, New Holland, Pa.
Cadis Creamery Co., Cadis, Pa.
Choconut Valley Creamery Co., Choconut, Pa.
Cochran Creamery Co., Cochranville, Pa.
Cold Spring Dairymen's Association, Doylestown, Pa.
Congo Creamery Co., Fulton House, Pa.
Co-operative Creamery, Centerville, Pa.
Corydon Creamery, Corydon, Pa.
Crystal Spring Dairymen's Association, Carversville, Pa.
Dairymen's Association of Klecknersville, Bath, Pa.
East Troy Creamery Co., R. D. 63, Troy, Pa.
Eldersride Creamery Co., Saltsburg, Pa.
Elk Creamery Company, Scandia, Pa.
Excelsior Co-operative Creamery Co., Birchardville, Pa.
Fallsdale Creamery Association, Fallsdale, Pa.
Farmers' Creamery Co., Woodbury, Pa.
Farmers' Creamery Association, Worcester, Pa.
Farmers' Creamery Company, Mount Joy, Pa.
Farmers' Creamery Company, Ltd., R. D. 5, Manheim, Pa.
Forest Grove Dairymen's Association, Forest Grove, Pa.
Forest Lake Creamery Co., Forest Lake, Pa.
Franklin Co-operative Creamery Co., Edinboro, Pa.
Friendsville Co-operative Creamery Co., Friendsville, Pa.
Gap Creamery Company, Gap, Pa.
Glyndon Creamery Co., R. D., Spartansburg, Pa.
Goldendale Creamery Co., Inc., Edinburg, Pa.
Granville Summit Creamery Co., Granville Summit, Pa.
Harford Butter and Cheese Association, Harfard, Pa.
Herrick Elgin Butter Factory, Uniondale, Pa.
Hillegrass Creamery, R. D., Pennsburg, Pa.
Hobbie Co-op. Creamery Association, Wapwallopen, Pa.
Iron Bridge Dairy Association, Little Meadows, Pa.
Jackson Center Creamery Co., Ltd., Trowbridge, Pa.

Jersey Hill Creamery Co., Rushboro, Pa.
Kempton Creamery, Kempton, Pa.
Lackawanna Co-operative Creamery, Prompton, Pa.
Lawn Creamery Company, Lawn, Pa.
Lawsville Center Creamery Co., Lawsville Center, Pa.
Liberty Valley Creamery Co., Liberty, Pa.
Little Meadow Creamery Co., Little Meadows, Pa.
Loux Creamery Co., Allentown, Pa.
Loux Creamery Co., Trexlertown, Pa.
Lucinda Elgin Creamery Co., Lucinda, Pa.
Masterson Creamery Association, Mastersonville, Pa.
Montgomery Creamery Co-op. Association, Mercersburg, Pa.
Montrose Creamery Co., Montrose, Pa.
Niagara Creamery Co., Niagara, Pa.
Orrtana Creamery Co., Orrtana, Pa.
Perkiomen Dairymen's Association, Creamery, Pa.
Plymouth Valley Creamery, Narcissa, Pa.
Plumsteadville Creamery, Plumsteadville, Pa.
Quaker City Creamery Co., Brackney, Pa.
Rock Glen Creamery Co., Rock Glen, Pa.
Rush Co-operative Creamery Co., Rush, Pa.
Salem Creamery Co., Emlenton, Pa.
Salem Creamery Co., Lamartine, Pa.
Saratoga Creamery, R. D. 4, Pottstown, Pa.
Cilverdale Creamery Co., East Canton, Pa.
Stewartstown Co-operative Creamery, Stewartstown, Pa.
Sunnyburn Creamery Co., Sunnytown, Pa.
Union Dairymen's Association, Wismer, Pa.
Warnick's Dairymen's Association, Jamison, Pa.
Warren Center Creamery Co., Warren Center, Pa.
West Jackson Creamery, Lawrenceville, Pa.
West Lathrope Creamery Co., Nicholson, Pa.
Winwood Dairy Association, Winwood, Pa.
Woodbury Creamery Co., Altoona, Pa.

**Individually Owned Creameries—**

Arbuckle Creamery, R. D. 7, Union City, Pa.
Bethlehem Creamery, Bethlehem, Pa.
Cloverdale Elgin Butter Factory, R. D. 76, Titusville, Pa.
Dewart Creamery, Dewart, Pa.
S. B. Brodbeck Creamery, Brodbecks, Pa.
Bridgeton Creamery, Bridgeton, Pa.
John I. Carter & Cons Company, Chatham, Pa.
Chadds Ford Creamery, Chadd's Ford Junction, Pa.
Darlington Creamery, Pomeroy, Pa.
Fredericksburg Creamery, Fredericksburg, Pa.
Hecktown Creamery, Hecktown, Pa.
Howard Creamery Co., Center Hall, Pa.
Howard Creamery, Glen Hall, Pa.
Jamison Bros. Creamery, R. D. 65, Emlenton, Pa.
Landis Store Creamery, Landis Store, Pa.
Levan Creamery, Lenhartsville, Pa.
Levin Dairymen's Association, R. D. 1, Chalfont, Pa.
Maple Place Creamery, Lander, Pa.
Theo. M. Moyer Creamery, Ferndale, Pa.
New Berlin Creamery, New Berlin, Pa.
New Era Creamery, R. D. 41, Wylausing, Pa.
Rutland Creamery, Troy Creamery Co., Troy, Pa.
Spring Grove Creamery, Spring Forge, Pa.
Turbotville Creamery, Turbotville, Pa.
Troy Creamery, Troy, Pa.

Abington Dairy Co., Inc., 322 Linden St., Scranton, Pa.
State Line Creamery, Akeley, Pa.
Acme Creamery, Sugar Grove, Pa.
Albany Creamery, Albany, Pa.
G. E. Allen, R. D. 46, New Albany, Pa.
Altenwald Creamery, Altenwald, Pa.
Bath Creamery, Bath, Pa.
Bear Lake Creamery, Bear Lake, Pa.
Beaverdam Creamery, R. D. 10, Corry, Pa.
Beaver Springs Creamery, Beaver Springs, Pa.
Bedminster Creamery, Bedminster, Pa.
Belleville Creamery, Belleville, Pa.
H. A. Benninger Creamery, Benningers, Pa.
Berne Creamery, Berne, Pa.
Bernville Creamery, Bernville, Pa.
Berwick Creamery, Berwick, Pa.
J. E. Bigart Creamery, Ariel, Pa.
Bingen Creamery, Bingen, Pa.
Birchrunville Creamery, Birchrunville, Pa.
Blooming Glen Creamery, Blooming Glen, Pa.
Blue Mountain Creamery, Waynesboro, Pa.
Blue Spring Creamery, Richland Center, Pa.
Blanch Valley Creamery, R. D. 2, Telford, Pa.
Brogueville Creamery, Brogueville, Pa.
Brookside Creamery, Sugar Grove, Pa.
Garrett E. Brownback, Elgin Creamery, Pittstown, Pa.
Brubaker Creamery, Brubaker, Pa.
William A. Buoo, New Freedom, Pa.
Buffalo Valley Creamery, R. D. 1, Lewisburg, Pa.
Bursonville Creamery, Springtown, Pa.
Butler Pure Milk Company, Inc., Butler, Pa.
Champion Creamery, Landisville, Pa.
E. S. Clark Creamery, Akeley, Pa.
Clear Spring Creamery, R. D. 2, Richland Center, Pa.
Clemo Creamery, Clemo, Pa.
Clifford Creamery Co., Clifford, Pa.
Clintondale Creamery, Clintondale, Pa.
Cold Spring Creamery, Loysville, Pa.
Cold Springs Creamery, Montandon, Pa.
Columbus Creamery, Columbus, Pa.
Hunter Patterson Creamery, Webster Mills, Pa.
Coopersburg Butter Factory, Coopersburg, Pa.
Cottage Hill Creamery, R. D. 5, Union City, Pa.
Crystal Spring Creamery, Berlin, Pa.
Cumberland Valley Creamery Co., Mechanicsburg, Pa.
Deep Run Creamery, R. D. 2, Perkasie, Pa.
Deep Park Creamery, 1024 R. E. T. Bldg., Landenberg, Pa.
Wilson H. Degler Creamery, Womelsdorf, Pa.
Denver Creamery, Denver, Pa.
Deodate Creamery, Deodate, Pa.
Dillsburg Elgin Creamery, Dillsburg, Pa.
Douglassville Creamery, Douglassville, Pa.
Drakes Corner Creamery, Hatfield, Pa.
East Berlin Creamery, East Berlin, Pa.
East Branch Creamery, R. D., Cpartansburg, Pa.
East Greenville Creamery, East Greenville, Pa.
Empire Creamery, North East, Pa.
Energy Elgin Butter Co., New Castle, Pa.
Ephraim Zug Company, Prescott, Pa.
Fairview Creamery, Blainsport, Pa.
Featherman & Fabel Creamery, East Stroudsburg, Pa.

Fleetwood Creamery, Fleetwood, Pa.
H. H. Fogelsanger & Co., Creamery, Green Village, Pa.
Fount Dale Creamery, Fayetteville, Pa.
P. J. Foust Creamery, Sigmund, Pa.
Franconia Creamery, Souderton, Pa.
Franklin Corners Creamery, R. D. 1, Fairview, Pa.
Gablesville Creamery, R. D. 1, Bechtelsville, Pa.
J. A. Gailey Creamery, New Park, Pa.
Henry G. George Creamery, Lansdale, Pa.
Gibertsville Creamery, New Berlinville, Pa.
Daniel S. Givler Creamery, Denver, Pa.
Glenside Creamery, Granville Summit, Pa.
Glenwood Cheese Factory, Glenwood, Pa.
Green Tree Dairymen's Association, Inc., Obelisk, Pa.
Griesemersville Creamery, Griesemersville, Pa.
D. S. Grisinger Creamery, McConnellsville, Pa.
Guernsey Creamery, Guernsey, Pa.
J. G. Haldeman Creamery, Thompsontown, Pa.
Abraham F. Halteman Creamery, Franconia, Pa.
Hanover Creamery Co., Hanover, Pa.
Harleysville Creamery, Harleysville, Pa.
Harmonsburg Butter Factory, Harmonsburg, Pa.
Harrisville Creamery Co., Harrisville, Pa.
D. & W. H. Hartman Creamery, Oley, Pa.
Hatch Hallow Creamery, Union City, Pa.
Hawthorne Creamery, Monroeton, Pa.
Edward Helb Creamery, Railroad, Pa.
Herbine & Kime Creamery, First Street, Birdsboro, Pa.
Herstand Creamery, Spring City, Pa.
H. H. Heyburn Creamery, Brandywine Summit, Pa.
High Ground Dairy Co., Inc., Hop Bottom, Pa.
High Lake Creamery, High Lake, Pa.
Hillchurch Creamery, Hillchurch, Pa.
W. C. Hinsbaugh Creamery, Centerville, Ca.
Hires Condensed Milk Co., Malvern, Pa.
Charles Hoffman Creamery, Mount Cobb, Pa.
George W. Hoffman creamery, North Wales, Pa.
John Holly Creamery, Colmar, Pa.
Hosensack Creamery, Hosensack, Pa.
Howard Creamery, Inc., 103 E. High Street, Bellefonte, Pa.
Jacob S. Hummel Company, Saylorsvurg, Pa.
India Creek Creamery, Franconia, Pa.
India Creek Creamery, R. D. 2, Telford, Pa.
Ironville Creamery, Hallertown, Pa.
I. X. L. Creamery, Inc., Friedens, Pa.
Jersey Shore Creamery, Jersey Shore, Pa.
Johnstown Sanitary Dairy Co., Johnstown, Pa.
Jordan Creamery, Oxford, Pa.
Katans Creamery, R. D. 11, Corry, Pa.
Kellers Church Creamery, Kellers Church, Pa.
Kimberton Creamery, Kimberton, Pa.
Klinesville Creamery, Klinesville, Pa.
Klopp & Kalbach Creamery, North Heidelberg, Pa.
F. H. H. Knight Creamery, New Bethlehem, Pa.
Samuel Koons Creamery, Gratesford, Pa.
H. S. Kratz Creamery, Nazareth, Pa.
Kreidersville Creamery, R. D. 3, Kreidersville, Pa.
Kunkle & Pyle Creamery, Gatchellville, Pa.
Kutztown Creamery, Kutztown, Pa.
Lackawanna Dairy Co., Main Street, Nicholson, Pa.
Lake Como Butter Mfg. Co., Lake Como, Pa.
Lanark Creamery, Lanark, Pa.

Lancaster Creamery Co., Lancaster, Pa.
Lander Creamery Co., Lander, Pa.
R. D. Landis Creamery, Milford Square, Pa.
J. S. Lavery Creamery, Lavery, Pa.
Nathan H. Leaser Creamery, Palm, Pa.
Lebanon Valley Creamery Co., Derry Church, Pa.
Lenover Creamery, Lenover, Pa.
Austin Leonard & Son, R. D. 63, Troy, Pa.
Le Raysville Creamery Co., Le Raysville, Pa.
Limekiln Creamery, Limekiln, Pa.
Limeport Creamery, Limeport, Pa.
Lincolnville Creamery Co., R. D. 4, Union City, Pa.
Loganton Creamery, Loganton, Pa.
Lovell's Creamery, R. D. 9, Corry, Pa.
John McDonald Creamery, Londonderry, Pa.
McKean Creamery, McKean, Pa.
Maginness & Beiler, Christiana, Pa.
Maiden Creek Creamery, Calcium, Pa.
Mainland Creamery, Mainland, Pa.
Manheim Creamery, Manheim, Pa.
Manifold & Wallace Creamery, York Street, Highrock, Pa.
W. S. Markley Creamery, Pottstown, Pa.
J. R. Meck Creamery, Meckville, Pa.
Mifflinburg Creamery Co., Mifflinburg, Pa.
Mill Creek Creamery, Kutztown, Pa.
Irvin Miller Creamery, Reading, Pa.
Mill Village Creamery, Mill Village, Pa.
Millville Creamery Co., Millville, Pa.
Milroy Creamery Co., Milroy, Pa.
Minerva Creamery, 525 1st Ave., Pittsburgh, Pa.
Mohrsville Creamery, Mohrsville, Pa.
Moorestown Creamery, Moorestown, Pa.
Johnston Moorhead Creamery, Sample Run, Pa.
Mount Bethel Creamery Co., Mount Bethel, Pa.
Mount Pleasant Creamery Co., Mount Pleasant, Pa.
Moyer & Eby Creamery, Campbelltown, Pa.
E. C. Musselman Creamery, Overton, Pa.
Myerstown Creamery, Myerstown, Pa.
Neshannock Falls Butter Co., Neshannock Falls, Pa.
New Galena Creamery, Levin, Pa.
New Jerusalem Creamery, New Jerusalem, Pa.
North Branch Creamery, Perkasie, Pa.
North Warren Creamery, R. D. 2, Warren, Pa.
Overshort Creamery, Towanda, Pa.
Pennsylvania Creamery Co., Inc., Knoxville, Pa.
Pennsylvania Creamery Co., Milan, Pa.
Perkiomenville Creamery, Perkiomenville, Pa.
Petersville Creamery, Kreidersville, Pa.
S. E. Phiel Creamery, Williamson, Pa.
Piersons Creamery, Waymart, Pa.
Pikeland Creamery Co., Anselman, Pa.
Pipersville Creamery, Pipersville, Pa.
Pleasant Valley Creamery Co., Milton, Pa.
Pleasantville Creamery, Manatawny, Pa.
Pocono Creamery, Tannersville, Pa.
Porters Creamery, Porters Sideling, Pa.
Prospect Creamery, Prospect, Pa.
Pugtown Creamery, R. D. 1, Spring City, Pa.
Reifsnyder & Fry Creamery, R. D. 1, Denver, Pa.
Reisst, Nissley & Co., Creamery, Mount Joy, Pa.
Richardson's Creamery, Hamburg, Pa.
Chas. M. Richardson's Creamery, Bernville, Pa.

Richlandtown Creamery, Richlandtown, Pa.
Rock Springs Creamery, Tyrone, Pa.
Rome Creamery, Towanda, Pa.
W. D. Rose & Co. Creamery, R. D. 2, Mansfield, Pa.
Rosedale Creamery, Shelly, Pa.
Rushing Spring Creamery, Kumry, Pa.
Salfordville Creamery, Salfordville, Pa.
Salona Creamery, Salona, Pa.
Sassamansville Creamery Co., Sassamansville, Pa.
Schuler Bros. Creamery, Vera Cruz, Pa.
Geo. Seip Creamery, Lenhartsville, Pa.
P. E. & W. Sharpless Co. Creamery, Ward, Pa.
Shartlesville Creamery, Shartlesville, Pa.
W. R. Shuler Creamery, Zionsville, Pa.
Silverthorn Creamery, Edinboro, Pa.
Harry W. Smith Creamery, Kresgeville, Pa.
South Gibson Creamery Association, South Gibson, Pa.
A. A. Spannutt Creamery, R. D., Myerstown, Pa.
Springboro Creamery, Springboro, Pa.
Star Creamery, Elk Lake, Pa.
H. H. Stauffer Creamery No. 1, Bechtelsville, Pa.
H. H. Stauffer Creamery Co. No. 2, R. D., Oley, Pa.
Steen's Creameries, Butler, Pa.
D. R. Stephens Creamery Co., Sayre, Pa.
Charles H. Stickell Creamery, Waynesboro, Pa.
Jacob S. Stover Creamery, Tohickon, Pa.
Stumptown Creamery, Bird-in-Hand, Pa.
Table Rock Creamery, Table Rock, Pa.
Tinicum Creamery, Bedminster, Pa.
J. Trumbauer & Son Creamery, Finland, Pa.
Trumbauersville Creamery, Trumbauersville, Pa.
Turner & Wescott Creamery, Glenroy, Pa.
Wm. F. Unger Creamery, Lederachsville, Pa.
Wm. F. Unger Creamery, Schwenkville, Pa.
Aaron Walmer Creamery, Myerstown, Pa.
Wattsburg Creamery, Wattsburg, Pa.
R. N. Weatherford Creamery, Lyon Valley, Pa.
West Auburn Creamery, West Auburn, Pa.
West Branch Creamery, Muncy, Pa.
West Chester Dairy, 110 W. Washington Street, West Chester, Pa.
Westgrove Creamery, West Grove, Pa.
Wheir Lake Creamery, Gilbert, Pa.
Farmers' Dairy Co., Inc., Wilkes-Barre, Pa.
Willow Hill Creamery, Willow Hill, Pa.
Yellowhouse Creamery, Yellowhouse, Pa.
Youngs Creamery, Youngs, Pa.
Peter Zacharias Creamery, Reading, Pa.

### Co-operative Cheese Factories—

Co-operative Cheese Factory, Greenville, Pa.
Congo Creamery Co., Congo, Pa.
Eastern Bradford Cheese Co., Le Raysville, Pa.
Farmers' Creamery Association, Worcester, Pa.
Kinney Co-op. Cheese Factory, Kinney, Pa.
Farmers' Protective Association, Linesville, Pa.
Lix Co-operative Cheese Factory, R. F. D., Athens, Pa.
Millerton Co-op. Cheese Co., Millerton, Pa.
Moserville Co-op. Cheese Factory, Wells, Pa.
Myersburg Co-op. Butter & Cheese Factory, R. F. D. 10, Towanda, Pa.
North Rome Co-op. Creamery, R. F. D., Towanda, Pa.
Osceola Cheese Factory, Osceola, Pa.

Oswayo Co-op. Cheese Factory, Oswayo, Pa.
Trinket Co-op. Cheese Factory, Ulster, Pa.
Union Dairymen's Association, Wismer, Pa.

### Individually Owned Cheese Factories—

Andrews Settlemen Cheese Factory, Andrews Settlement, Pa.
John Baumback Cheese Factory, R. F. D. 3, Union City, Pa.
B. Beach Cheese Factory, Sunderlandville, Pa.
E. A. Bean Cheese Factory, Knoxville, Pa.
Bean & Murdock Cheese Factory, Westfield, Pa.
E. S. Bell & Co., Cheese Factory, Austinburg, Pa.
Bertram Cheese Factory, R. F. D. 26, Cambridge Springs, Pa.
Bingham Center Cheese Factory, R. F. D., Ulysses, Pa.
Birchard Cheese Factory, R. F. D. 21, Cambridge Springs, Pa.
J. H. Bragdon Cheese Factory, Waterford, Pa.
T. J. Carmody & Co., Cheese Factory, Elkland, Pa.
John E. Case Cheese Factory, Turtlepoint, Pa.
Chatham Valley Cheese Factory, R. F. D. 2, Middlebury Center, Pa.
Cherry Flats Cheese Factory, Mansfield, Pa.
Chestnut Hill Cheese Factory, Bear Lake, Pa.
Chrystal Cheese Factory, Chrystal, Pa.
J. M. Clark Cheese Co., Mansfield, Pa.
Lawrence Clark & Co., Cheese Factory, Beaver Center, Pa.
A. C. Close Cheese Factory, Keeneyville, Pa.
Cloverdale Cheese Factory, R. F. D., Wellsboro, Pa.
Chas. J. Conable Cheese Factory, Gold, Pa.
Fred S. Coolidge Cheese Factory, R. F. D., Gillette, Pa.
Coryland Cheese Factory, R. F. D., Gillette, Pa.
Crossingville Cheese Factory, Crossingville, Pa.
Drakes Corner Creamery, Hatfield, Pa.
Drakes Mills Cheese Factory, Cambridge Springs, Pa.
East Greenville Cheese Factory, R. F. D. 3, North East, Pa.
East Greenville Cheese Factory, East Greenville, Pa.
Eleven Mile Cheese Factory, Eleven Mile, Pa.
Ellisburg Cheese Factory, Ellisburg, Pa.
Eldred Cheese Factory, Eldred, Pa.
Erie County Milk Association, Erie, Pa.
Espyville Cheese Factory, Espyville, Pa.
Excelsior Cheese Factory, Wattsburg, Pa.
Fairview Creamery, R. F. D. 1, Fairview, Pa.
Forest Home Cheese Factory, Waterford, Pa.
Frances Cheese Co., Girard, Pa.
Fraconia Creamery, Souderton, Pa.
Franklin Center Cheese Factory, Edinboro, Pa.
French Creek Cheese Factory, R. F. D. 1, Waterford, Pa.
Garland Cheese Factory, Garland, Pa.
Golden Rod Cheese Co., Cambridge, Pa.
Gravel Deerlick Cheese Factory, R. F. D., Knoxville, Pa.
Greeley & Obert Cheese Factory, Lincolnville, Pa.
Abraham F. Halterman Cheese Factory, Franconia, Pa.
Edward Hishman Cheese Factory, Venango, Pa.
Holly Bros. Cheese Factory, Souderton, Pa.
Honeoye Cheese Factory, Honeoye, Pa.
L. W. Howden Cheese Factory, Coryville, Pa.
Chas. Hunt Cheese Factory, Hickox, Pa.
Jewell Cheese Factory, Cambridge Springs, Pa.
A. B. Long Cheese Factory, Saegerstown, Pa.
Lottsville Cheese Factory, Lottsville, Pa.
McStay & Edwards Cheese Factory, Elmer, Pa.
Mainland Creamery, Mainland, Pa.
Matthews Run Cheese Factory, Youngsville, Pa.
Mende Bros. Cheese Factory, 1245 So. 11th Street, Philadelphia, Pa.

F. A. Millet Cheese Factory, Ulysses, Pa.
Millport Cheese Factory, Millport, Pa.
Moslertown Cheese Factory, Moslertown, Pa.
Mystic Cheese Factory, R. F. D. 4, Cambridge Springs, Pa.
Naseby Cheese Factory, R. F. D. 6, North East, Pa.
Newell Brook Cheese Factory, Eldred, Pa.
Nodine Cheese Factory, Cambridge Springs, Pa.
North Bingham Cheese Factory, North Bingham, Pa.
Northfork Cheese Factory, Northfork, Pa.
North Rome Creamery, R. F. D., Towanda, Pa.
Palmer Creamery & Cheese Factory, R. F. D. 2, Conneautville, Pa.
Rileyville Creamery Co., Rileyville, Pa.
Rockdale Center Cheese Factory, R. F. D. 27, Millers Station, Pa.
Salfordville Creamery, Salfordville, Pa.
Shinglehouse Cheese Factory, Shinglehouse, Pa.
Springboro Creamery, Springboro, Pa.
A. L. Squire Cheese Factory, Townville, Pa.
Daniel Strong Cheese Factory, Wells, Pa.
Summit Central Cheese Factory, R. F. D. 2, Erie, Pa.
Sylvester Cheese Factory, Westfield, Pa.
Tioga Cheese Factory, Tioga, Pa.
F. W. & Wm. Trowbridge Cheese Factory, Westfield, Pa.
Alex. Wass Cheese Factory, Little Marsh, Pa.
Waterford Cheese Factory, Waterford, Pa.
West End Creamery, Telford, Pa.
West Farmington Cheese Factory, Inc., Osceola, Pa.
Westford Cheese Factory, Westford, Pa.
West Union Cheese Factory, R. F. D. 2, Union City, Pa.
C. M. Wheeler Cheese Factory, Leboeuf, Pa.
White Corners Cheese Factory, Harrison Valley, Pa.
Woodcock Cheese Factory, Woodcock, Pa.
Woodcock Valley Cheese Factory, R. F. D. 12, Meadville, Pa.

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